The Journal
OF THE KANSAS MEDICAL SOCIETY

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The Journal of the American Chemical S

VOL. 50 FEBRUARY, 1928

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1928

[Contribution from the Research Laboratories of Parke, Davis and Co.]

THE ACTIVE PRINCIPLES OF THE POSTERIOR LOBE OF THE PITUITARY GLAND.[1] I. THE DEMONSTRATION OF THE PRESENCE OF TWO ACTIVE PRINCIPLES. II. THE SEPARATION OF THE TWO PRINCIPLES AND THEIR CONCENTRATION IN THE FORM OF POTENT SOLID PREPARATIONS

By Oliver Kamm, T. B. Aldrich, J. W. Grote, L. W. Rowe and E. P. Bugbee

Received December 31, 1927 Published February 4, 1928

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DETROIT, MICHIGAN

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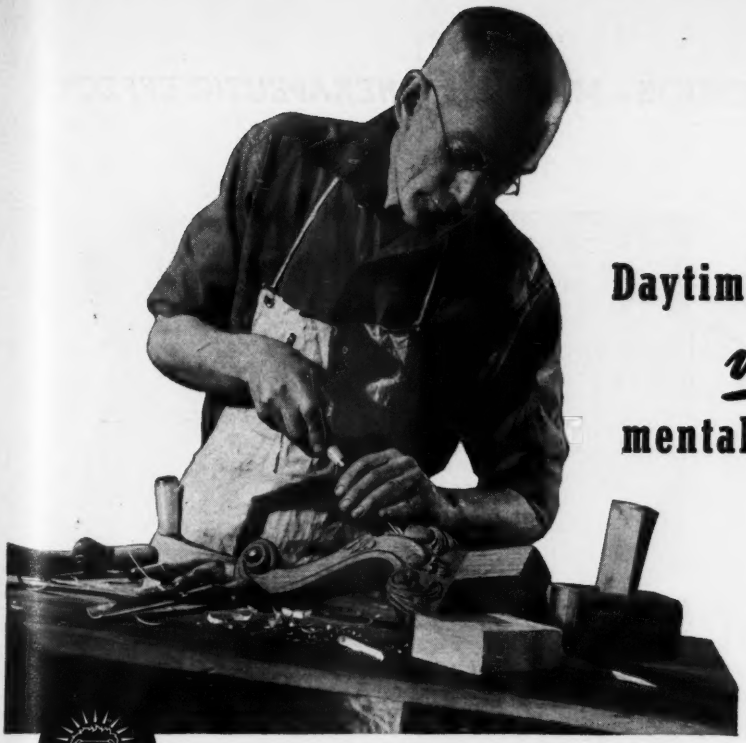

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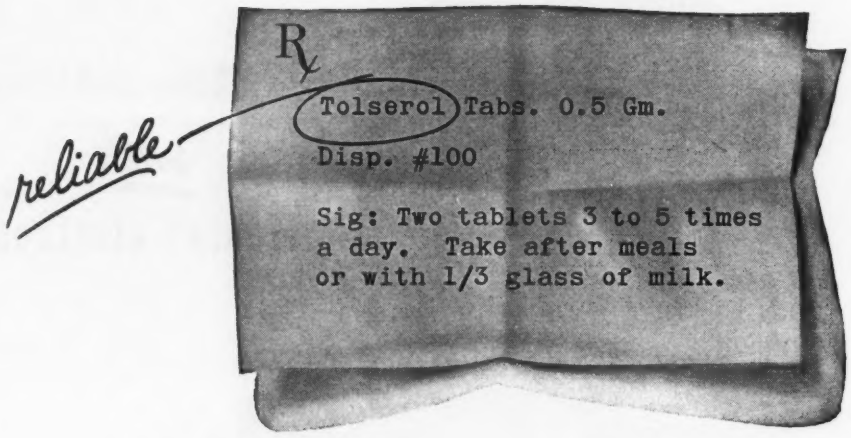

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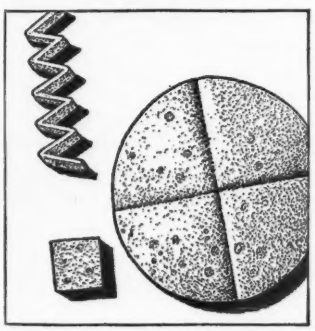

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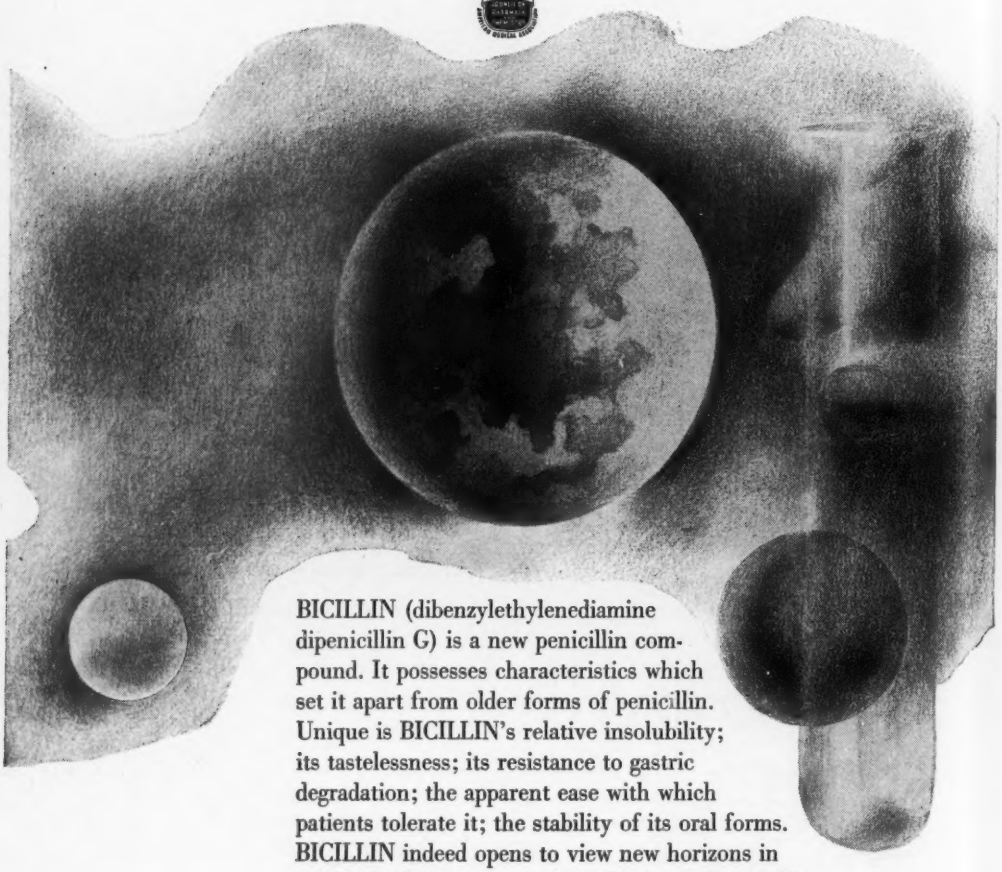

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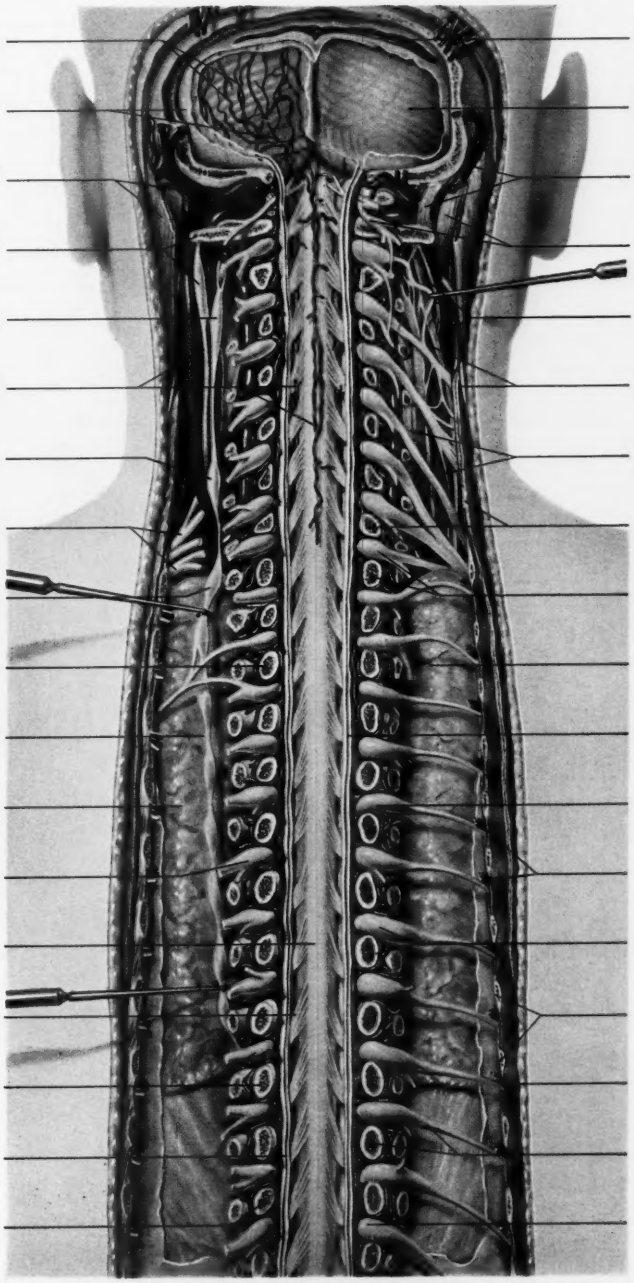
Inferior cerebellar veins
Cerebral dura (cut); post. inf. cerebellar artery
Sternocleidomastoid muscle; deep cervical vein
Transverse process of atlas; nodose ganglion
Sup. cerv. ganglion
Vagus nerve; post. spinal artery and vein (cut)
Middle cerv. ganglion
Brachial plexus
Inf. cerv. ganglion
Third thoracic vertebra
Sympathetic trunk
Left lung
Sixth thoracic ganglion
Posterior median sulcus
Post. root, ninth thoracic nerve
Ninth thoracic ganglion; tenth thoracic vertebra
Arachnoid (cut)
Twelfth thoracic vertebra
Transverse sinus
Cerebellum (covered by arachnoid)
Rectus capitis lateralis m.; occipital a. and v.
Digastric muscle; first cervical nerve
Hypoglossal nerve; internal jugular vein
Accessory nerve; internal carotid artery
Anterior scalenus muscle; common carotid artery
Seventh cervical vertebra; trapezius muscle
Eighth cervical ganglion; first thoracic vertebra
Right lung
Spinal dura mater (cut)
Fifth thoracic ganglion
Intercostal arteries and veins
Seventh thoracic ganglion; eighth thoracic vertebra
Ribs (cut)
External intercostal muscle
Tenth thoracic nerve; eleventh thoracic vertebra
Twelfth thoracic ganglion

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ULRICH C. LUFT, M.D., School of Aviation Medicine, Randolph Air Force Base, Tex.
CARL TEMPEL, Colonel, M.C., Fitzsimons General Hospital, Denver.

Program: **Monday, November 16**

SEGMENTAL PULMONARY ANATOMY.
PULMONARY FUNCTION.
TELEVISED THORACIC OPERATION.
MANAGEMENT OF CHRONIC PULMONARY DISEASE.
CHEMOTHERAPY OF TUBERCULOSIS.
CLINICO-PATHOLOGICAL CONFERENCE (with Pathological Demonstration).

Tuesday, November 17

BEDSIDE TEACHING—Drs. Allen, Delp, Dimond, Herbert, Rankin and Reissmann. (Pulmonary, heart and renal diseases; arthritis and hepatic disease.)
RENAL PHYSIOLOGY.
EXPERIMENTAL HYPERTENSION AND ITS RELATIONSHIP TO ESSENTIAL HYPERTENSION.
PANEL: THE MANAGEMENT OF CHRONIC RENAL DISEASE.

Wednesday, November 18

BEDSIDE TEACHING—(Same instructors with additional cases).
MANAGEMENT OF CHRONIC ARTHRITIS.
PHYSICAL MEDICINE AND CHRONIC ARTHRITIS (with Demonstration).
PANEL: ARTHRITIS IN INFECTIOUS DISEASE.

Thursday, November 19

PORTAL HYPERTENSION.
TELEVISED BILIARY TRACT OPERATION.
WRITTEN COMPREHENSIVE QUIZ AND REVIEW OF TOPICS.

Other Courses

GYNECOLOGY
November 9 to 11, 1953

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PSYCHOSOMATIC MEDICINE FOR GENERAL PRACTITIONERS
Female Reproductive System
December 10 to 12, 1953
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SURGERY
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1. Ferguson, C., and Miller, [illegible]: J. Urol. 67:762 (May) 1952.
2. Teaton, H. M., and Lind[illegible]: [illegible]:815 (Feb.) 1952.
3. Bisbey, P. R.: Cornell M. [illegible] (Feb.) 1952.

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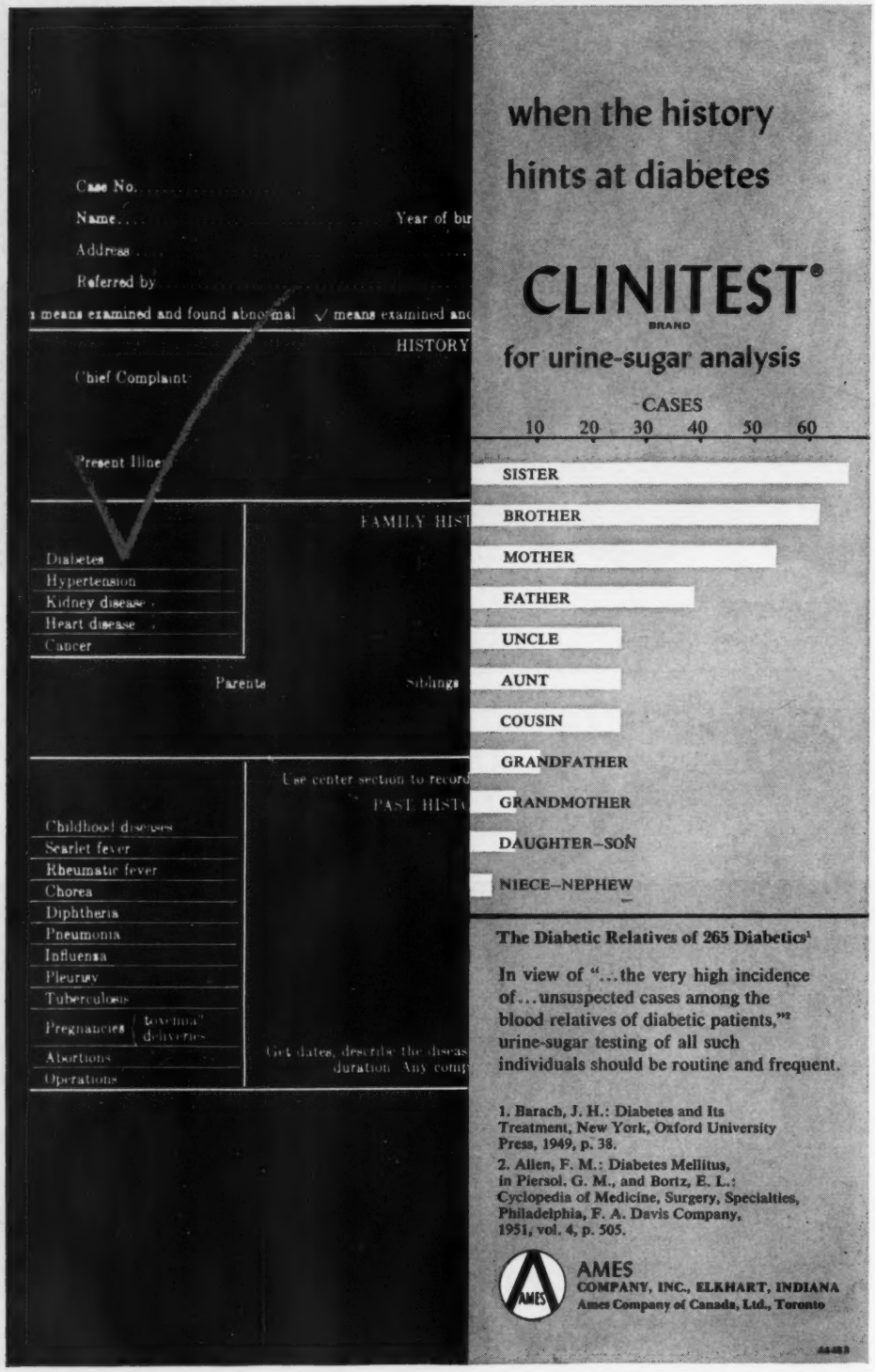
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1. Barach, J. H.: Diabetes and Its Treatment, New York, Oxford University Press, 1949, p. 38.
2. Allen, F. M.: Diabetes Mellitus, in Piersol, G. M., and Bortz, E. L.: Cyclopedia of Medicine, Surgery, Specialties, Philadelphia, F. A. Davis Company, 1951, vol. 4, p. 505.
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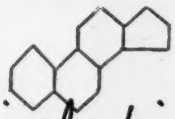
the symbol SCHERING denotes leadership in steroid hormone  research and manufacture -- including Cortogen in the most useful clinical forms.

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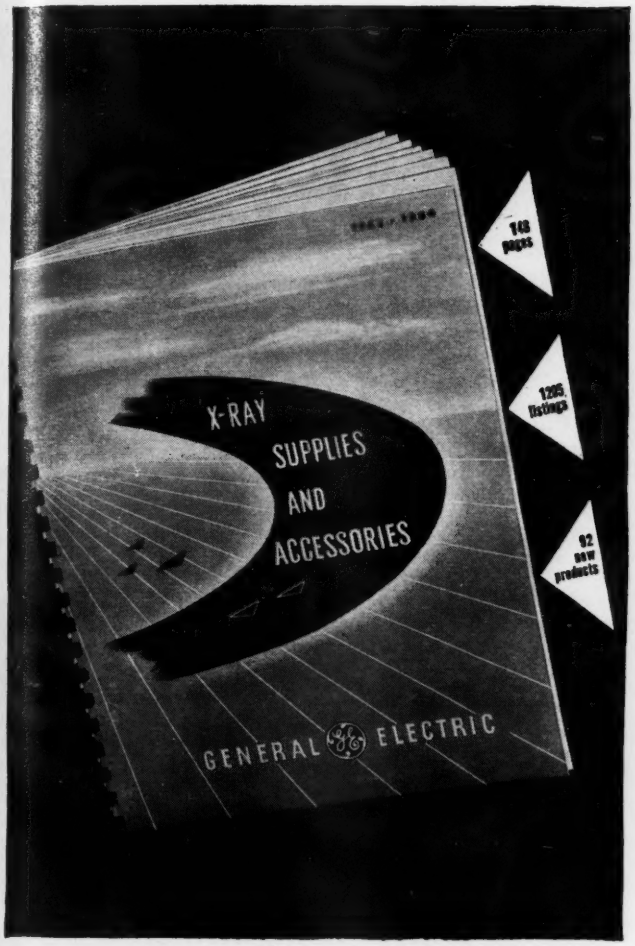

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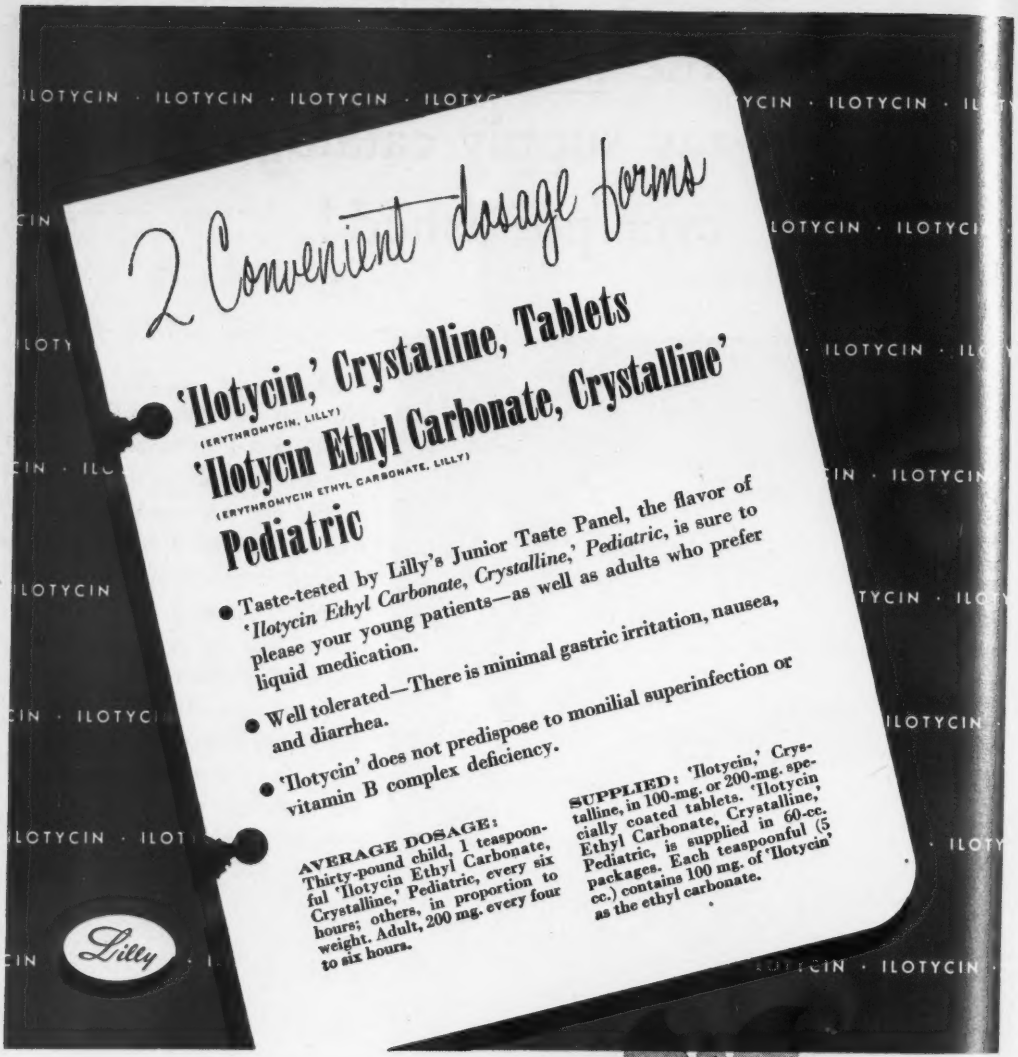
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Volume LIV OCTOBER, 1953 No. 10

Planning for Civil Defense

Editor's Note. Mr. Standish Hall, director of Civil Defense for Kansas, was asked to supply an introduction for this issue of the Journal, devoted to problems of emergency medical care. Mr. Hall's contribution follows.

It has been my experience that the medical profession and its allied groups are better able to visualize what our civil defense problems would be in case of World War III than other groups who are not faced daily with human suffering and the care of injured people.

That being the case, it is only proper that this issue of the JOURNAL OF THE KANSAS MEDICAL SOCIETY should be devoted to the subject of medical organization relative to civil defense.

Much progress has been made, but much remains to be done. No one but you, yourself, can say what you should and would do after the bombs begin to fall. Intelligent thinking and constructive planning will save many lives. Of course, we shall not have anything like the supplies that we shall need or the personnel necessary to do a real job. It will be makeshift at the best, but I am convinced, if you will get your teeth into this program and shake out a plan, that you will save thousands of lives and help materially toward the winning of that war, if it can be won.

STANDISH HALL
State Director of Civil Defense

Medical Organization for Civil Defense

Thomas R. Hood, M.D., M.P.H.* and James M. Mott, M.D.**

Topeka, Kansas

INTRODUCTION

This article includes a description of general plans for meeting medical and health aspects of natural or other disasters in Kansas. It describes the problem posed us at a recent meeting of the Kansas Civil Defense Council and the actions we believed we would take. Finally, outstanding, unmet needs are enumerated. Some of these needs can be met by more intensive action on our part—others require public support and legislative action.

The effectiveness of disaster planning and application, in the event of an emergency, is clearly dependent on the public's conviction of the need. We are certain that the medical society and its individual members will contribute generously of their unique skills and time whenever these are needed. When disaster occurs, it is important for physicians and others to remain in their own communities until their services are requested. It should always be borne in mind that the physicians who remain at home and serve there are filling an important need.

The civil defense plans contained herein have been made cooperatively with Dr. Donald Trees, chairman of the Committee on Emergency Medical Care of the Kansas Medical Society.

As described below, we have devised the framework for Health Disaster Services in Kansas, along the same lines as the existing pattern of everyday services. We are convinced that our own capacity to perform will be reached and exceeded very quickly—simply by the unusual demands for control of sanitation and by communicable disease control problems. We believe that medical care should be rendered by the same personnel who ordinarily render such care. We have correspondingly divided the services shown on the organizational chart and have, with his permission, placed the chairman of the Committee on Emergency Medical Care of the Kansas Medical Society at the head of Medical Care Services.

We anticipate that, when any large-scale disaster occurs, the state health officer will promptly become director of health and medical services for the state of Kansas and will function as a part of the state's civil defense organization. The assistant state health officer will promptly move up to become acting state health officer, in charge of all sanitation and disease control problems which arise. The medical society will be in charge of medical care.

The third major branch shown on the organizational chart is that of General Services and Administration. Here we have purposely listed two individuals, one of whom is familiar with methods of obtaining supplies through governmental channels and the other familiar with the task of obtaining medical supplies through private channels.

Not outlined on the chart are five advisory committees. These committees and their chairmen are as follows: Blood and Blood Derivatives, Dr. A. A. Fink, Topeka; Radiological Health, Dr. Galen M. Tice, Kansas City; Biological and Chemical Health, Dr. Noble P. Sherwood, Lawrence; Mental Health, Dr. William Roth, Kansas City, and Training and Public Information, Mr. Adel F. Throckmorton, Topeka.

CIVIL DEFENSE PLAN

General Statement. The principle followed throughout the medical section of the Kansas Civil Defense Plan is one of full utilization of existing services, facilities, and organizations, including professional groups and individuals as well as governmental agencies. An attempt has been made to provide for full utilization of all professional skills within the framework of existing patterns of service, in the belief that any emergency which occurs will require, first, an intensification of the usual activities of a great many individuals, and secondly, activities of a new or unusual character which will place heavy and unaccustomed responsibilities on many persons. It is our task here to see that skills and services are properly organized, correlated, and augmented to meet such emergency situations as may arise.

The need for separate but well-correlated organizations to discharge the great responsibilities involved in medical care and in public health aspects of disaster problems is reflected in the organizational chart. The term "medical care," as used herein, is a broad and comprehensive one including by way of description—but not limitation—the services ordinarily rendered by physicians, dentists, veterinarians, nurses, pharmacists, hospitals, and others. The services of the many and varied types of public health personnel would also be fully utilized in performing the duties indicated below in the

* Executive Secretary, Kansas State Board of Health.
** Director, Division of Preventable Diseases, Kansas State Board of Health.

organizational chart and the detailed description which follows.

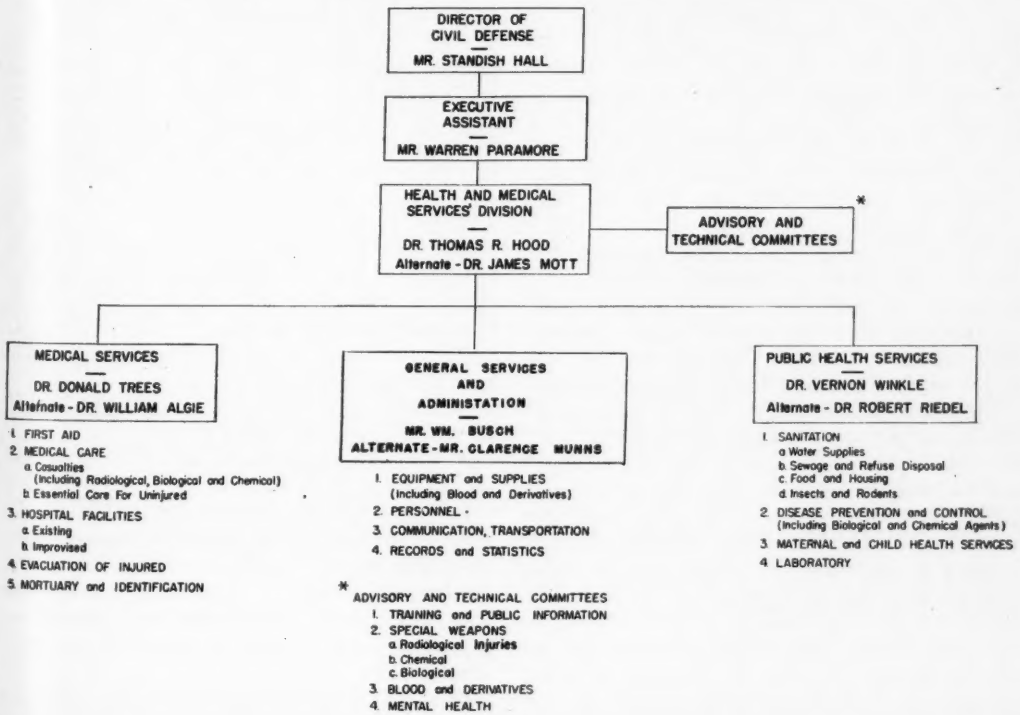
It should be borne in mind that we are dealing with the possibility that medical care personnel and public health personnel, already inadequate in numbers to fully serve everyday needs, perhaps further depleted by calls to military service, may have to perform vastly increased duties in the event of a disaster. With these facts in mind it appears that there is a great need for training of volunteers in first aid, basic sanitation, and other subjects. The demands for service may be greatly increased by population shifts brought about by defense needs or as the direct effect of aggression.

This organization and plan are intended to function in case of any emergencies resulting from any cause, whether it be natural or manmade (48-904 General Statutes of Kansas 1951.)

Plans which are developed will be of such nature that they are applicable on a state-wide basis and include such flexibility that they will allow for meeting the requests of other states or regions in the United States for mutual aid. While it is recognized that civil defense is based on a very large element of individual and local responsibility and autonomy, it is also recognized that because of the essential nature of medical care and of public health services, and the limited number of qualified persons able to serve in these fields, plans must recognize the necessity of subordination of local medical and health services—including personnel and facilities to state direction and regional coordination—in order that essential services be rendered where needed as quickly as possible. Not only is this program essential to the saving of life, the preservation of health, and the maintenance of high morale of the citizens, but it must also return people to early and effective use in the nation's manpower.

Duties of the Director. The director of the organization on Health Services and Special Weapons Defense is responsible for the organization and allocation of health services personnel, stockpiling of suitable supplies and equipment, and the development and implementation of medical care plans. The director is appointed by the governor and functions under the general direction of the state civil defense director and the advisory council, and also relies on the advice and assistance of several advisory and technical committees and the heads of the three

KANSAS CIVIL DEFENSE
ORGANIZATIONAL CHART - HEALTH SERVICES



operating services shown on the organizational chart. A Committee of the Whole will consist of the deputy and his alternate, the director of each major subdivision and his alternate, and the chairmen of technical and advisory committees.

The organizational chart is drawn in an attempt to show clear delineation between advisory staff committees and administrative or line organization. The intent is to make full use of a variety of highly specialized skills and knowledges in developing plans and procedures, and yet provide a simple, streamlined functional organization. Coordination with other major state civil defense services is essential. These include especially the welfare services, transportation, communication, Red Cross information, and training committees.

Functions of Civil Defense Health Services. This service is responsible for the plans and functions in all fields related to health arising from a disaster due to natural causes or enemy action. Included are:

1. Emergency medical care for casualties.
2. Preserving essential medical services for persons other than casualties.
3. Essential public health services, including special attention to protection from biological, radiological, and chemical agents.
4. Consultation and advice to communities to assist them in perfecting their own civil defense organizations and arranging for mutual aid and support to other communities.
5. Arranging for the assignment of personnel and the procurement of supplies, communication, and transportation within the health services.
6. Special training and public information.

CIVIL DEFENSE PROBLEM

On September 2, the Kansas Civil Defense Council was handed the following problem and asked to describe the immediate actions it would take if confronted with the situation described. The problem consisted of an assumed 12:30 p. m. 20-kiloton A-Bomb exploded over Kansas City, zeroed on the Kansas side of the Intercity Viaduct. The estimated casualties are 21,855, with 8,605 dead and 13,250 injured. Estimated situation as to condition of the injured is that there are 5,000 stretcher casualties, 5,000 who are ambulatory or semi-ambulatory, and the remaining 3,250 need first aid treatment and can then be released. There are an estimated 20,000 homeless individuals needing food and shelter, of which half may be evacuated. The city building is demolished, but most employees were at lunch and were not caught in the building. The City-County Health Center is demolished and all stockpiled medical supplies and equipment are destroyed. Three hospitals within a two-mile radius of the blast are badly damaged and must be presumed unusable. These include St. Margaret's, Providence, and Bethany hospitals. The Kansas City civil defense director reports that most of his key men have reported for duty and are mobilizing their personnel, but that most of the people are badly shocked and excited, and it appears that all possible help will have to be rendered from outside the city.

Suggested actions include immediate notification of all key individuals shown on the Health Services organizational chart, with a request that they report for duty without delay. In addition, officers of medical societies in each of several counties closest to Kansas City will be asked to furnish seven first aid teams immediately. They will be informed where to send these teams; each team is expected to consist of two physicians, one dentist, three registered nurses, and one pharmacist. Seven aid stations will be established immediately in specified grade schools and junior high school buildings, and Wyandotte High School will be converted to an emergency hospital. Two points would be designated for ambulance dispatch points. All hospitals in adjoining areas will be notified to discharge immediately all patients who can be moved to homes. The Kansas University Medical Center would be notified that we expect to send it all cases requiring immediate surgery.

The Civil Defense Depot at St. Louis would be requested to immediately ship, by air, 1,000 litters, 2,000 blankets, 3,000 morphine syrettes, 5,000 units of plasma or plasma extender, 1 complete 250-bed hospital, complete equipment and supplies for 10 first aid stations, with additional duplicate shipments of expendable supplies every 24 hours until further notice. In addition, we would request that the Kansas civil defense director immediately furnish 14 ambulances with two drivers each, to be followed as soon as possible by 36 additional ambulances, with drivers, and 5 trucks to shuttle between the Kansas City, Kansas, airport, hospital, and first aid stations. We would also request that immediate provision be made to feed and house medical personnel and that 105 trained first aiders and 700 litter bearers be placed at our disposal.

This plan obviously covers only the early phases of the activities that would be called for and reveals how drastically inadequate our efforts and supplies might be.

It appears that our state of readiness is inadequate and, in particular, that medical personnel would meet with early frustration because of the lack of necessary equipment and supplies. It also immediately appears that the Kansas civil defense organization should proceed to stimulate training of additional first aid personnel and litter bearers and with a realistic inventory of the number, types, and

location of all medical and paramedical personnel in the state of Kansas.

Immediately following the above civil defense exercise, we renewed our plea to the civil defense director for sufficient funds to stockpile essential medical supplies in fireproof warehouses outside of critical target areas. These supplies should include the following items: 10 first aid stations, with 20-hour supplies; 5,000 morphine syrettes; 1 auxiliary hospital; 10,000 units of plasma or plasma extender. These purchases are recommended on the basis that they represent items which would be urgently needed in the event of any considerable number of casualties, and because no improvised substitutes could possibly be adequate. We also expect, in the near future, to prepare a set of standard maps of Kansas, with overlay, showing all types of medical installations and medical supply facilities in Kansas, as well as maps showing county populations and the number and types of active medical and paramedical personnel in each county.

Following the completion of this task, we expect to again confer with medical society and other professional representatives and arrive at some working figures for estimating the minimum number of physicians, and others, who would have to be retained in each county to take care of ordinary medical emergencies arising locally. Therefrom we could quickly deduce the number of individuals who might be called out of each county to assist in any emergent disaster.

CONCLUSION

We have here attempted to outline the basic thinking behind the general plans and organization for medical aspects of civil defense in Kansas; have outlined the plans and organization, as presently visualized and, finally, have shown through the medium of a civil defense problem, how the organization might function and what the most glaring deficiencies would be. It is a pleasure and privilege to have presented this material to the members of the Kansas Medical Society.

Civil Defense Organization*

The Federal Civil Defense Administration has prepared numerous pamphlets on various phases of civil defense activities. These contain detailed descriptions of recommended functions in the different services. Portions of this material have been revised by the Kansas Office of Civil Defense to make them more appropriate for the particular situations applying in this state. The following article contains material from those and other sources. It is not sufficiently complete to be considered a summary or digest of the information contained therein, but is rather prepared as an introduction to the subject and as a tentative guide to physicians preparing local defense projects or who may volunteer their services under the state program.

By way of introduction, much might be said pro and con concerning civil defense activity prior to its need. On the one side, it might well be considered a waste of effort since civil defense might never be called into use and, even if needed, the requirements would not fit into the plan as formulated on paper. The other side of this argument appears more realistic since whatever preparation may be obtained prior to the need for such services is just that much better than none at all.

In case of a disaster occasioned through natural or accidental causes, assistance from areas outside the affected location might be needed immediately, and the time lag during which an emergency program is implemented could well be detrimental to the injured. In case of war in which enemy action is brought to bear within this nation, areas struck will need civil defense assistance from adjacent communities without any question whatsoever. Moreover, in case of war, the armed forces will be of little or no assistance in civil defense.

This project, therefore, has a two-fold purpose. It could be called into action in smaller units for any accidental situation arising within this state and, in case of war, provides a framework for self protection. This is essential in the saving of civilian lives, but, in addition to the above, is useful in assuring the early resumption of production for the war effort. Therefore, the Editorial Board of the JOURNAL determined to devote this issue to the subject of civil defense, in the hope that physicians in communities all over the state may be stimulated to organize units of whatever size might be provided within their own respective areas.

THE FEDERAL GOVERNMENT

Some years ago, the United States Congress appropriated a sum of money to be available to the states on a matching basis with which to aid in the

* A compilation of material issued through federal and state manuals listed in the bibliography.

establishment of civil defense projects. These were listed in the *Journal of the American Medical Association* early this summer and represent only the potential rather than the real allotments available. In Kansas, for example, a sum of $1,180,000 is available through the federal government for civil defense, of which $97,549 is available for medical expenses. This compares favorably with most states and at the same time reflects graphically on the many states that have failed to take any part in such programs. Half of all states received no tentative appropriation for medical care, simply because there was no provision under which allotments could be obtained. Nor has Kansas received the above stated amount since each federally appropriated dollar must be matched with an equal amount of state money. The 1953 Kansas legislature gave only a small sum, if any at all, to civil defense, and therefore this program is largely the result of planning and certainly is not ready for operation.

THE STATE PLAN

The Kansas civil defense plan, described elsewhere in this issue, has been completed as far as its broadest organization is concerned. The governor of the state directs the program. He has appointed a director of civil defense, and each of the major subdivisions is headed by a director of that service. These include, among other things, such functions as transportation, welfare, fire, public information, etc. There are 11 such deputies, each a member of the Council of Civil Defense for this state.

Counties likewise have the rudiments of plans in existence. Here the project is directed by the mayor of the county seat city and, depending upon his individual efforts, there are 8 deputy directors representing, on a county level, similar services to those named above. In the larger communities, considerable local organization is completed. It is recommended that all counties prepare at least a plan on paper that might be employed on short notice should a need from any cause whatever require such service.

HEALTH SERVICES

Perhaps the most urgent of all civil defense activities is the Division of Health Care. This is certainly true for a brief period immediately following a disaster. Even a small disaster, such as the crash of a commercial plane, could immediately tax local medical and hospital facilities in a small community far beyond their capacities. A tornado might require health services from a wide area around the affected location, and, in the event of an atom bomb falling upon a congested area within this state with an estimated potential of 50,000 persons injured, every possible resource available in this state would not be sufficient to care for the need. So, even if civil defense is never used, it appears worthwhile as protection. It is insurance that can pay large dividends, most particularly in the field of medicine where the hours of practice drilling will not be required, and it can save that all important loss of time within the first few hours after the disaster strikes.

MEDICAL ORGANIZATION

The principal immediate need is to prepare on paper the actual names of physicians and other attending personnel who will be available as teams. Units will vary as to size according to the numbers and types of physicians available, but in every component medical society there are sufficient members so that a portion may be spared for services elsewhere. It is those names that should be made available to the local civil defense authority. In such preparations, there should be borne in mind the necessity for continuing usual local medical care. In preparing a disaster team, it is roughly presumed that no more than 50 per cent of the available medical strength should be requested to leave the community at any one time.

The federal government designates one type of medical unit to consist of a first aid station group. As is usual with federal projects, their suggestions are elaborate, estimating a first aid group to consist of 232 persons, of which 3 are physicians. They include such others as 105 litter bearers, 16 ambulance drivers, etc. For Kansas, such organization is impractical and could well be accomplished on a smaller scale.

There should, however, be at least one physician in charge of each first aid station. He should be carefully selected because of an exceptional ability in rapid diagnosis. The first aid station will be located as close as practical to the actual scene of the disaster. Through this station, all injured will pass and be evaluated. In brief, this doctor is responsible for segregating the injured and directing the future course of their care. He will quickly determine their status according to one of four categories.

Speaking now in terms of wide-scale disaster in which many are injured, he will first of all delegate the hopelessly injured to the clergy and lay people for terminal care on the scene. At a time when every facility is taxed to its utmost, it becomes uneconomical to utilize professional care in a terminal attention for the hopelessly injured. In the second category are the seriously injured. At the first aid station, only the immediate life saving measures will be introduced. Pressure bandages will be applied, or tourniquets, as indicated. An initial morphine injection will be given if required, or hasty tem-

porary splints will be applied, and those patients will then be ordered to the base hospital and will be immediately transported by ambulance for further care. In the third category will be found the less seriously injured or those persons who may need considerable medical attention but are not in immediate critical condition. They, too, will be given whatever first aid is required and will be placed on a stand-by basis to be cared for when the emergency has passed. The fourth category comprises the walking injured who will be turned over to aides for bandages or whatever other medication may be given, and then discharged.

It is obvious that the one or two physicians directing activities at this extremely busy location will not have time to give personal attention to each victim. They must initiate the treatment by order and depend upon the ability of aides who have some training in first aid care. The importance of the physician in this position is that he will make an immediate determination of the victims' extent of injury. Upon his judgment will rest the ultimate success or failure of the entire disaster effort.

He will of course need help from many people, not only those who will actually perform the services of placing splints upon broken arms, but he needs an administrative staff to keep records of what was done as well as the names and addresses, if they can be obtained, of all persons who pass through the station.

Behind this area, at the closest possible location, will be established a base hospital. At this point services are required for all specialties in medicine, including physicians who will be engaged in other than caring for the traumatic cases. It has been estimated, for example, that approximately 20 per cent of all pregnant women adjacent to the area covered by an atomic bomb will miscarry. They will be directed through the first aid station to the base hospital, to be placed under the care of an obstetrician. Mass hysteria could quickly require the services of psychiatrists in numbers far exceeding their availability. Therefore, the organization of a base hospital must be considered with such patients in mind in addition to the physically injured. Again, in the case of widespread disaster, even the base hospital will quickly be overcrowded so that here, too, an evaluation of the patient's condition will need to be made rapidly so that professional services can be used to maximum efficiency.

It has been planned by the Civil Defense Council that school houses shall be requisitioned as hospitals because they will more readily be adapted for such purposes than any other common structure. School houses are centrally located, whereby volunteer civilian help may be quickly assembled. They are more adaptable than hotels because their rooms are larger and they are usually only one or two stories tall. In the event of an electrical failure, a hotel would become almost useless as a hospital. Moreover, schools have kitchens and adequate water supplies. In the state planning, it is expected that the school children themselves shall be utilized for taking out desks and other equipment. As rapidly as possible, Army-type cots shall be brought in, and by the time the medical team arrives the physical facilities should be as nearly ready for operation as they ever can be. Therefore, in the larger population centers, or in wider areas of rural locations, the various specialists should organize into complete hospital staffs and be prepared to move out of their own locations to work in these temporary hospitals.

A third type of medical service necessary under civil defense will be the existing hospital facilities outside the immediate disaster area. Here, also, a complete staff will need to be available, and for a long while following the disaster will be required to provide reconstructive care. In preparing personnel for civil defense, all these factors must be borne in mind. The staff at local hospitals must not be depleted. There must, however, be in addition to those available for immediate call, a number of completely organized hospital staffs. In addition to that, there will be needed a number of first aid units, each directed by at least one, or preferably more than one, physician. And, finally, there must still remain within each locality enough basic medical care to provide services within the locality as needed. It is easily seen that the task might be a formidable undertaking and that no amount of planning can ever provide enough. The question then is rather that of planning to make a little produce its ultimate maximum in efficiency, and that is the principal reason for presenting this subject in the JOURNAL.

MATERIAL AND EQUIPMENT

As if the above did not provide sufficient difficulty, there are other factors that will greatly complicate the health effort in time of disaster. For example, the curious and the well wishers will immediately jam the highways, making transportation of official personnel almost impossible. Any number of physical conditions might further complicate the picture, such as contamination of food and water supply, etc.

Perhaps even greater than any of the above is the fact that all essential equipment and material will not only be in short supply but may possibly be nonexistent. It is easily possible that disaster teams may assemble at a designated point and be forced to continue operation not only for hours but for days without materials or equipment to work with. Regardless of how much previous planning is done,

this problem can never be completely solved and will have to be accommodated to existing situations, whatever they might be. Equipment could be borrowed from other hospitals, but it must be remembered that a school house converted into an emergency hospital begins without any equipment.

The federal government is stockpiling essential supplies. Exact information is not available, nor would it be of any particular value even if it were accurately known. However, something in the vicinity of 20 per cent of the necessary supplies for 5,000,000 casualties for a three-week period has already been accumulated. The decision as to what shall be needed and procurement of these items at reasonable cost represents a formidable difficulty.

One hundred items have been selected somewhat arbitrarily to be the most essential. For example, large numbers of blankets will be needed, and, instead of spending considerable sums on such items, a new type of single-use paper blanket has been developed. These may be discarded after they have served their one-time purpose and are more economical than blankets of wool or other cloth. Stories are told of airways that cost $1.50 each but have been remodeled by civil defense authorities and are available at 15 cents apiece. It is quite possible that there would be some criticism concerning their effectiveness, but in planning for large numbers the original cost of high grade material always places a severe budgetary brake upon any item. As simple an item as portable flashlights, when produced by the millions, can become a major expense. Here also they are designed for short time use and discard, which results in an individual saving over comparable equipment to be used by the armed forces.

Another problem concerns drug supplies that become outdated. Considerable amounts of penicillin are already available, as is smallpox vaccine. Tetanus antitoxin and other items can be gathered from supply houses in a reasonably short time. Narcotics are available in adequate amounts, but the problem of release and distribution becomes a serious obstacle.

In general, the federal plan is to withhold 50 per cent of all supplies, to be used wherever a disaster of first magnitude occurs. The other half is to be dispersed to the states. Kansas has already received shipments of certain material which is currently being packaged and stored for further distribution as local defense units become implemented. The federal government has even packaged entire hospitals into units weighing 3½ tons that are available for shipment where needed. In these units are included portable electric systems, self contained steam autoclaves, and a considerable supply of instruments, bandages, a variety of drugs, etc. These are presumably complete even to administrative supplies such as typewriters, stationery, etc.

OTHER SERVICES

The objective of this review is to acquaint the physician with the medical side of civil defense preparations. From the point of view of numbers, certain other services are considerably larger. Planning is proceeding in those areas also. Air raid wardens are being organized throughout the country. Communications programs are planned toward the utilization of all resources that will be rapidly organized to fill in in case of the failure of usual communication procedures. The solution of traffic problems will be a major item, and here, too, plans are being made for the maintenance of highways to permit the transportation of essential vehicles. In many areas all trucks and vehicles that might be converted into ambulances have been listed, and plans are made for requisitioning them into essential service should the need arise. Welfare programs have been organized to take care of shelter and clothing. Police and fire services are planning toward the expansion of personnel to include thousands of volunteers who will be available for duty on call.

There are, however, even more specific services requiring a considerable skill, as for example decontamination teams. In Kansas, this too has been completed, at least as far as plans on paper are concerned. In the event of war damage to a Kansas community by the atom or hydrogen bomb, monitoring teams with equipment to detect radioactive and chemical or gas contamination will be the first authorized persons to enter the affected area. As rapidly as they declare sections to be safe, the first aid teams and emergency first aid stations will be moved into those locations. Another service already anticipated concerns sanitation. As soon as possible after the occurrence of a disaster of the above mentioned type, food and water supplies will be analyzed and sorted according to their acceptability.

Here again, it would be wasteful to produce hundreds or thousands of expensive and accurate Geiger counters and leave them idle against the possibility that they might be useful. So a substitute has been devised. The instrument appears to be known as a pocket dosimeter which is capable of registering the presence of radioactivity within rough limitations. The use of this instrument is not expected to produce completely accurate results. It is designed, rather, to provide rapid quantitative analyses and is at least accurate enough to be of practical value. Specimens of food will be prepared, containing some radioactive material within the level of safety. The monitor will check the dosimeter reading of the local food supply against the sample he carries in his pocket. If a rapid reading discloses contamination to be greater than the sample, the

food will be discarded; if less, it will be considered safe for consumption.

OTHER TYPES OF WARFARE

A discussion of this kind would not be complete without at least mentioning as potential threats various other types of instruments of warfare. Many of these are little known at the present time. Authorities are reluctant to predict their value, and certainly not much has been accomplished with reference to defense. They are mentioned here because it is known that they represent potential weapons and, if used, may serve to seriously complicate the entire civil defense effort.

One is biological warfare. What form will be used or how it will be disseminated can hardly be predicted. It is presumed, however, that if used it will probably be prior to an overt attack because its effect will be manifested relatively late. Authorities believe that almost nothing can be done at this time, except possibly to increase the programs of immunizing the population against smallpox, typhoid, and diphtheria. If such warfare is used, and an air raid occurs at the height of a considerable epidemic, the additional complicating factors can easily be imagined.

Chemical warfare has also been suggested. This again produces problems that cannot now be effectively counteracted. New materials may produce situations that cannot be anticipated at present, but most authorities are of the opinion that some form of mustard gas or a nerve gas might be used. Variations are known to be available in forms that are not readily detectable. Probably the only present defense is to evacuate a population as rapidly as possible after the existence of such chemicals in the atmosphere has been established. This probably will become known first through the recognition of symptoms among the patients earliest affected.

Also to be considered are such problems as bacterial warfare, utilized against existing food supplies. The Department of Agriculture and doctors of veterinary medicine are being alerted concerning outbreaks of animal diseases. Similar would be the implantation of plant diseases either through the introduction of insects or substances that might destroy edible crops. The most distressing problem relating to this subject is the fact that it might take several years to realize that this has taken place. At the present time, there is a surplus of grain, but, in the event of that type of war activity, it might be a number of years before sufficient food supplies could again be raised to eliminate the danger of starvation.

SUMMARY

A review has been presented of some of the projects under way toward providing the United States with an effective means of civil defense which might be utilized following accidents or disasters originating either through natural causes or as the result of enemy action. A very brief description was given of the various types of services that are being mobilized in this regard.

Slightly more attention was paid to the necessity for medical mobilization because medical care will undoubtedly become the most critically needed service immediately following a disaster. It was pointed out that practice periods and test runs are not essential for physicians because they will function largely in the field of their primary activity, except for greatly expanded needs. However, the need for medical mobilization is present.

It is recommended that county medical societies plan now toward assigning physicians to civil defense tasks, keeping in mind that no less than one-half the total local supply of physicians must be retained in the community at all times, and that one-half should be available in smaller units as first aid teams or organized into complete hospital staffs. For this latter, care should be taken not to deplete the staffs of existing hospitals which must continue to function even in time of disaster.

The above is not intended to suggest that an enemy attack is more imminent today than in the past. It is presented in this issue of the JOURNAL because it appears wiser to be prepared against the worst that could happen and never be needed rather than to suddenly be confronted with the need and not be prepared.

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The civilization of a country consists in the quality of life that is lived there, and this quality shows plainest in the things that people choose to talk about when they talk together, and in the way they choose to talk about them.

—Albert J. Nock

The Medical Role in Civil Defense

There is a story told of a woman who was rescued out of the debris of a bombed building in London during the height of its air raids in World War II. Discovered to be conscious, she was asked to supply some identifying information and, when asked of the whereabouts of her husband, she said, "He joined the army, the coward."

During the intense bombing of London, the civilian population must certainly have considered life with the army a relatively safer experience. It is ardently hoped that the experience of London will never be repeated and that the United States may continue to be spared the havoc of direct enemy action. A small preparatory effort in the field of civil defense organization would be no sacrifice at all in contrast to its value if needed, this value being reflected in terms of lives saved, the reduction of panic, and the resumption of the nation's war effort.

Even that, although by far the most dramatic phase of civil defense, is not necessarily all the advantage to be gained by such planning. Except for a few relatively minor occurrences, Kansas has long been free from major disasters caused by accidental or natural means, but, should such occur, it would not need to be numerically very large before health facilities within the area became overtaxed. Nearby areas would immediately offer aid, but the resulting confusion, even if it lasted only a short time, could seriously delay the effective work that might be done. Therefore, it is within this realm of activity, perhaps even more significantly than in the preparation against war disaster, that an organization for civil defense is needed.

Whatever the cause, a large scale disaster would immediately establish a vast need. If it is of considerable proportions, adequately trained health personnel would never be available in sufficient quantity. Much service would have to be performed by lay persons with little or no training. Their effectiveness would be in direct ratio with whatever previous training they had received. The subject, then, is of importance to all persons, and the lagging interest in first aid classes for civilians is genuinely regretted. There can be no argument against the statement that education prior to a disaster will aid in the prevention of panic. It will help prepare people for tasks they shall suddenly be required to perform. It will reduce the confusion. It is, therefore, a prophylaxis against the stunning effects of disaster which might be outlined as adequate education, mobilization, preparation of supplies, and possibly the prior immunization of the population against certain diseases such as tetanus.

In case of a disaster, the role of the doctor will be very similar to the role of the physician in his usual practice. The difference is only one of degree. There will be more patients requiring attention, perhaps infinitely more. There will be fewer persons to assist him in rendering this care. The help will be awkward and inexperienced. There will be less material with which to work, perhaps none at all. Therefore, a disaster of considerable magnitude will tax not only the physical strength and the professional skill but the tolerance and ingenuity of every doctor in this state.

He will be confronted with the task of saving the most possible lives. He will discard the finesse and the luxuries of his everyday practice and dispassionately segregate casualties according to priorities or into the designation that time spent in their care is hopeless. Elsewhere in the JOURNAL, medical organization has been discussed and some remarks were contained concerning equipment. Here a brief résumé is introduced concerning the difference between emergency care and the usual private practice of medicine. Again, the distinction is largely a matter of degree but can be defined in a number of services that will increase the physician's efficiency.

MEDICAL PREPARATION BEFORE THE DISASTER

A large-scale disaster will immediately create a problem of performing only such services as will serve to save the lives of the greatest number. All else must be discarded for the moment. There are things that may be accomplished prior to the disaster. The first of these is medical organization, described elsewhere. The second is the need for accumulating adequate triage material. This includes such simple things as scissors and the hundreds of other items the physician is accustomed to work with but which, without advance planning, will not be available when needed. A third concerns the organization of people. It is planned that school houses may be used as auxiliary hospitals, and certainly the Parent-Teacher Associations would provide a resource of interested lay persons who might perform many worthwhile duties at the time of disaster but whose services could be invaluable during the preparation period. For example, a community survey might list the locations and number of available extra cots and beds that might be collected upon a moment's notice. Blankets, clothing, even dishes and cooking utensils, might be urgently needed and unavailable except through local resources. It is certainly not recommended that these be assembled, but if lists could be obtained, collection would then become a relatively simple task.

Fourth is the problem of training. Even one hour of instruction for lay people by a physician would

reap dividends if their services were needed. One hour of explanation on how an injured person will be placed on a litter, on the need for proper identification, etc., would certainly not be time wasted. And, finally, it appears that a certain amount of publicity could be useful. There is a difference between the frightening type of story that paints pictures of mass casualties and calm realization that the best efforts of our people are needed to produce effective results. It is that type of publicity that can well originate within the profession.

FIRST AID MEDICAL STATION

The first aid station shall be the first line of medical care. It shall be placed as near the scene of disaster as practical, and in the case of an atomic explosion will be located at the closest point declared safe by the monitor service. All casualties will be directed to the first aid station.

Medical decisions must be made rapidly and accurately. A quick sorting of casualties will separate the hopelessly injured and place them in charge of the clergy and lay aides without further medical care. The second category will consist of the seriously injured who will receive preliminary lifesaving or limb-saving treatment at this point and then be transported to rear hospitals. The third category will be the lesser injured or those for whom treatment may be temporarily delayed. The director of the first aid station must have unusual ability and calm judgment. His rapid diagnosis becomes of utmost importance.

The first aid station also serves as the point at which casualties are decontaminated through the removal of clothing and by whatever other means might rapidly be employed. Here also records and reports must be prepared on each casualty and appropriate messages sent along with those who are to receive additional hospital treatment. Of equal importance, although often neglected until the emergency arises, is the need for establishing a chain of command. Duties for each person, for the skilled, the semiskilled, and the unskilled aides must be delineated with a clarity that enables each to perform his most effective service with the least confusion. All this must be accomplished without adequate personnel and equipment and can readily be seen to require the services of an unusual medical director.

It often has been said that the physician will require little advance training for civil defense work. His efforts will still be in the field of medicine, with only a change in emphasis. There are, however, certain alterations of technique. With possibly thousands waiting to be cared for, it becomes impractical to exert heroic effort in the attempt to save an individual life. The entire purpose is to provide the greatest benefit for the most people. Work must be rapid. Care is of an emergency variety, and only those services that are essential to the saving of life can be performed at the first aid station.

The director of the station will immediately draw out of line for first-priority care those patients with penetrating wounds of the abdomen, with sucking wounds of the chest, with wounds of the face or neck that destroy or obstruct the airway, with traumatic amputations, and those who, because of hemorrhage or shock or open fractures or injuries to major blood vessels, will rapidly fall into serious conditions. They must be seen first. If presumed to be in hopeless condition, they shall be set aside. The others will be given fast, lifesaving treatment and immediately shipped to emergency hospitals.

By way of example, the first aid station may shortly exhaust its supply of sterile dressings and must thereafter utilize whatever cloth can be obtained. Dressings shall principally consist of the pressure type to prevent further wound contamination and reduce continued blood loss. Once completed, this dressing must be left in place until the victim reaches a hospital where more complete care can be given. The only exception is upon the decision of a physician and then for reasons of saving the victim's life.

A compression dressing will generally reduce hemorrhage within safe levels, and, if it fails to do so, a tourniquet should be applied. A recent technical bulletin of the Civil Defense Administration advises at some length that a tourniquet "should be used only for life-endangering hemorrhage that cannot be controlled by other means." This should be placed as low as possible, proximal to the wound, and a tag should be attached giving the location and the time of application. It has been determined that it is no longer good practice to release tourniquets at intervals because lives have been lost through this procedure while it has actually prevented the loss of very few limbs. Therefore, if a tourniquet it required, it should be left undisturbed for three or four hours if necessary. Even that length of time produces relatively little risk of ischemic gangrene, while the repeated release of the tourniquet increases the risk of fatal shock. The tourniquet should not be released except by a physician who is prepared to control the hemorrhage by other means and to adequately replace blood volume. In case of a large-scale disaster, this probably cannot be accomplished before the victim reaches the hospital.

The above has generally been established as accepted procedure also in the case of traumatic amputations. There will be little time at a first aid station for debridement or for the careful exploration of wounds for foreign matter; neither will

operating equipment be available nor aseptic conditions prevail. Therefore, these procedures are secondary to the control of hemorrhage, and nothing more than absolutely essential service will be performed, after which the patient will be transported to the hospital.

Emergency splints will be put on only if the casualty cannot otherwise be safely transported. Slings will be improvised from the patient's clothing. A fractured humerus may be bound to the chest. A folded newspaper may serve as a splint for the forearm or wrist. A sharp ax with which to fashion splints from trees or nearby lumber immediately becomes an essential instrument at a first aid station. Should a cast be required, this must be split or bivalved to prevent circulation embarrassment during travel. There is no time for attempted alignments of bones at a first aid station. A fluoroscope, even if available, will be used for many other purposes and cannot be released for bone alignments. Moreover, the alignment probably would not hold during transportation. Injuries to the skull and spine require special care, especially on the part of litter bearers who should be carefully instructed in this regard before reporting for duty.

The problem of tetanus will reach serious proportions. The best treatment, quite obviously, would be to have actively immunized the entire population with tetanus toxoid prior to the disaster. Then a stimulating dose of toxoid could be made routine at the first aid station for all casualties with open wounds. In the absence of this advance protection, there remains some doubt as to where or when the antitoxin should be administered. Many victims will be unable to recall whether they have previously received such injections, and the effort required for making skin sensitivity tests and the carefully repeated injections might occupy more time than is available at the first aid station. Therefore, this should be determined by the size of the disaster and the availability of material and medical care. If not performed at the first aid station, it certainly should be planned for and accomplished rapidly upon the victim's arrival at the hospital.

In patients where satisfactory evidence is obtained that a series of three tetanus toxoid injections has previously been received, a booster dose of tetanus toxoid 0.5 to 1 cc. hypodermically should be given. Patients not previously immunized should receive tetanus antitoxin 3,000 units hypodermically, but only after a negative skin test. Where hypersensitivity exists, increasing fractional doses of antitoxin should be given, beginning with 0.001 to 0.01 cc. at intervals of 20 minutes. Adrenalin should be available in case of anaphylactic reaction. In the presence of clinical infections, the dose of tetanus antitoxin may be repeated every 7 days for 2 or 3 doses. But, again, in a large scale disaster, this type of treatment cannot be performed at the sorting station and must be done later.

Morphine will be distributed to the first aid station but should be administered with caution, and possibly not at all, to the walking wounded. It should be recalled that the absorption of morphine will be retarded in many of the seriously wounded cases, and, if repeated doses are given, morphine poisoning might result later when circulation has been improved. It is generally recommended that morphine be given at the first aid station only to those in severe pain and that the standard dosage be one-sixth of a grain given intramuscularly. This should not be repeated, except under express orders of a physician, until the patient is at the hospital. The physician should further familiarize himself with average weight tables for children and be prepared to administer smaller doses where indicated.

In a large-scale disaster, the supply of blood and blood derivatives will fall short of the immediate demand. This must quickly be anticipated and used sparingly until adequate supplies can be obtained. In case of shock recognizable at the first aid station, blood replacement is given not to obtain normal pressure but to provide a level of safety. Plasma and plasma expanders are useful for this purpose but should be recognized as stopgap therapy. Again, this becomes a matter of providing emergency care for the most people, and there is no time to adequately follow a long course of infusion for an individual. It is also readily recognized that cross matching will not be practical under those conditions. Therefore, if whole blood is used in the initial emergency following a major disaster, it must be type O only.

One of the major responsibilities that will confront the triage officer will be the evaluation of burns. Here, again, federal handbooks outlining recommended courses for treatment state that an immediate evaluation must be made at the first aid station. Those walking patients with minor burns shall be set aside to receive treatment when more time is available or be instructed to treat themselves. Slightly more serious burns may be cared for by aides. Casualties with moderately severe burns which do not immediately threaten life should be made comfortable and set aside for hospitalization as soon as the most critical patients have been transported. Burned casualties who may be saved by vigorous therapy should immediately be transported to a hospital. These are generally younger individuals with burns up to 80 per cent and others with second degree burns involving 20 per cent to 70 per cent of the body surface and varying amounts of third degree burn. Older patients with burns of more than 50 per cent of the body surface and all in-

dividuals with third degree burns exceeding 80 per cent should be set aside unless physicians have time to give them individual attention. When the physician believes there is a chance for their possible recovery, patients in this category should immediately be sent to the hospital.

The easily remembered rule of nine is recommended for the immediate determination of the extent of burns. Here body surfaces are divided by percentages to enable a quick evaluation. Each side of each lower extremity is rated at nine per cent. Each side of each upper extremity is rated at four and one-half per cent. The trunk is 18 per cent on each side, the head nine per cent, and the neck one per cent.

EMERGENCY HOSPITAL TREATMENT

The above is a brief résumé of a few suggestions for rapid, essential first aid care. Should a large-scale disaster occur, rapid care of a slightly different nature will also be in order at the emergency hospital. In case of an atomic bomb blast, it is presumed that hospital facilities within a three-mile radius of point zero will be out of service. Emergency hospitals will be set up in school houses. They will be staffed with specialist services as described elsewhere in this issue. Material and equipment will be faulty and in short supply if, indeed, there is any equipment at all.

At such points will be assembled those casualties who have previously passed through a first aid station and who, upon the consideration of the triage officer, are in immediate need of medical treatment. Should hundreds or perhaps thousands of such patients arrive at a single hospital, it will become impossible to give adequate care even at this point. Here the procedures will be somewhat more detailed than at the first aid station but still considered emergency measures. Reconstruction, the closing of wounds, the long-time therapy for burned patients will be performed later at permanent hospitals in the perimeter of the affected area. This section, therefore, deals only with the next phase of emergency care which follows after the first as rapidly as these most seriously injured patients may be transported to the emergency hospital.

Surgery at such a hospital will be designed to perform the greatest immediate benefit for the greatest number. Surgeons must evaluate their responsibility in relation to facilities in the emergency hospital and those that might be available in other permanent hospitals. At this point, initial wound surgery is performed. Foreign bodies or materials are removed from the wound, devitalized tissues are excised, hemorrhage is stopped, transfusions are given, and limbs are immobilized for further transportation. In case of surgery, it is considered wise to leave the wound open after provisions have been made for drainage. In general, this is still emergency surgery, but it is performed under surgical conditions and represents one further step toward enabling the patient to withstand the next journey to a regular hospital where his care may be completed.

Transfusions will create a major problem during the first few hours, and possibly days, depending upon the number of casualties requiring blood. It is presumed that typing facilities will not be available at a first aid station and probably will not become immediately useful at the improvised hospital. Therefore, during the initial phase, group O blood must be used. If group O Rh negative blood is available without facilities for Rh typing of recipients, this should be reserved for young women and female children, for women who have had children, and for persons who have had multiple blood transfusions. If typing can be performed, then the Rh negative blood should be reserved for Rh negative persons to prevent sensitization. Of course, plasma and blood volume expanders will be used wherever possible to conserve the supply of whole blood for such patients where this type therapy is essential.

Another civil defense effort of which little has been said is the necessity for setting up an emergency procurement and blood station near the temporary hospital. It may become necessary to compromise accepted methods for processing blood. The standard for selection of donors may also need to be lowered. No compromise can be made, however, in the care with which cross matching shall be performed. Complications resulting from carelessness in cross matching are inexcusable, even during the confusion that will attend the first hours following the disaster.

Much has been written concerning the emergency treatment of burns, but this subject is complicated by many differing opinions as to the methods of choice. It appears wisest, perhaps, to select a physician with experience in this field to head the ward for burned patients and to leave treatment to his judgment. If many burned patients appear, he will quickly realize that adequate care cannot be given each individual. He must, therefore, once again segregate the casualties, according to his evaluation, as to the extent of their injuries and concentrate, at least during the initial phase, upon that group in which his efforts may save the most lives.

Almost nothing has been mentioned in this paper concerning the radiation syndrome which might represent the chief complaint of a large number of casualties. Civil defense authorities outline symptomatology in four categories. The very severe case, having received 600 r or more of radiation dosage, will exhibit symptoms on the first day. This generally begins with malaise, nausea, and vomiting, to

be followed by prostration and rapidly developing severe leukemia. During the next few days diarrhea and rising, sustained fever may be expected. Death will follow probably within 14 days after exposure.

The severe case will have received about 400 r of radiation dosage and will also present early symptoms of nausea and vomiting which will subside within 24 hours. The various symptoms will be noted up to about the 20th day, after which the patient may become seriously ill with numerous symptoms including general sepsis. Death is expected in approximately 50 per cent of untreated cases where sepsis or hemorrhagic manifestations dominate the picture.

The moderately severe cases will occur following 200 to 300 r of radiation dosage. Symptoms on the first day will be similar to the above. During the next two weeks, no definite symptoms may be noticed except a moderate lymphopenia. After two weeks, a number of things may appear, such as malaise, epilation, sore throat, petechiae, diarrhea, and weight loss. Most of these cases are expected to recover without treatment. If death occurs, it is rare prior to six weeks and will usually be due to complications such as chronic abscesses, refractory anemia, tuberculosis, etc.

Mild cases are those having received less than 200 r of radiation dosage. They will show a few of the above symptoms with fatigue sometime during the third to the sixth week after exposure. They are expected to recover, but even mild radiation injury may lead to complications and retard recovery from burns or trauma.

Treatment is mostly supportive. Patients should be given rest and sedation. They need good medical care and the restoration of water and electrolyte balance. Good general nutrition should be maintained. There appears to be some question regarding the value of transfusions for the treatment of radiation sickness. Civil defense handbooks indicate that blood replacement should be employed only when required by hemorrhage or anemia. Early transfusions have not been shown to alter the outcome of radiation sickness.

SUMMARY

Material presented in this paper represents excerpts from handbooks on emergency medical care in time of mass disaster. Presented was a brief outline of recommended treatment procedures designed to provide efficient use of skilled health personnel. It is never intended that individualized care should replace the above-suggested techniques except in time of disaster when personalized service is impossible. It is further suggested that all the above are outlined in broad form to indicate acceptable procedures. They should be varied according to circumstances prevailing at the time.

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"A free society means a society based on free competition, and there is no more important competition than competition in ideas, competition in opinion. This form of competition is essential to the preservation of a free press. Indeed, I think the press should set an example to the nation in increasing opposition to uniformity."

—Adlai E. Stevenson

Public Health Lessons of Kansas Disasters

Thomas R. Hood, M.D., M.P.H.*

Topeka, Kansas

INTRODUCTION

Quite independent of any enemy action, disasters do occur in Kansas. Some of these disasters are local, highly specialized in nature, and involve comparatively few individuals, while others are large-scale, complex generalized disasters threatening or destroying large amounts of life and property.

Kansas has been fortunate in recent years in having no generalized disasters involving a large number of casualties or a large loss of life. The localized and specialized disasters have been distressing indeed for those persons affected. They include an outbreak of a typhoid fever epidemic in a state institution, an episode of food poisoning following a company picnic, an anthrax outbreak among cattle, and episodes of diarrhea and enteritis almost too numerous to mention. The only large-scale general disaster occurring in Kansas in recent years was the 1951 flood. A number of these localized episodes have been described in reports, and these are listed in our bibliography. Many of these localized outbreaks have been confined and minimized by prompt epidemic investigations and application of specific suitable control measures. Public health work in connection with the state's one major widespread disaster is briefly described below.

Doubtless many more local disasters and local disease outbreaks would have occurred if less attention were paid to proper sanitation, food handling practices, and special preventive measures. This, of course, leads us to the inevitable conclusion that uniform conscientious application of known sanitation and preventive practices would have prevented many or all of the localized outbreaks which did occur. We are constantly striving for such application of known preventive measures for a reduction in the gap between knowledge and practice.

The work engendered by the 1951 flood can well be divided into two phases. The first phase includes the problems of restoration of sanitary facilities such as water supplies, sewage treatment and disposal, milk supplies, and problems of mass feeding. The second phase encompasses the rehabilitation and clean-up tasks. Like all classifications, this is one of convenience and overlapping does occur between the two phases.

* Executive Secretary, Kansas State Board of Health.

PHASE ONE

The 1951 flood removed 37 Kansas municipal water supplies from operation and damaged or threatened many others. Some were saved only by the strenuous labor of armies of volunteers. Warnings were issued wherever householders would find it necessary to boil water to assure its safety and purity. Numerous emergency portable water purifiers were set up in strategic places; plant personnel, public health engineers, and others accomplished difficult tasks in restoring water plants within a relatively few days following the flood. In many places, sewers were plugged with silt and refuse from the flood and had to be cleaned or dug up and replaced. In certain instances, more primitive means of sewage disposal had to be utilized for temporary periods.

A supply of pasteurized milk was maintained in most areas through pooled use of operable plants. Where this was impossible, the public was advised to boil milk before drinking it. Lack of refrigeration in some areas made it imperative to distribute and use milk and other perishable foods immediately.

Mass Shelters and Feeding: Mass shelters were used in communities where large numbers of people were displaced from their homes. Demand for space in the mass shelters did not rise to a peak immediately following the crest of the flood, but rather a few days later. Apparently many individuals were able to make temporary arrangements for shelter with friends and relatives, but when it appeared that it would be some weeks before other housing was available, these refugees found it advisable to move to a public shelter.

Problems arose in these shelters relating to overcrowding, inadequacy of rest rooms, and food preparation and preservation. Specialized problems arose in connection with those individuals who were infirm, either physically or mentally, and mothers and infants required special attention. Families who were enduring the shock of the flood and destruction of their property often had to endure the additional trauma of family separation, since physical facilities in mass shelters lent themselves better to arrangement of beds in large dormitories with sexes separated than they did to preservation of family units. Mass feeding problems merit special attention.

In the writer's observation, no special problem existed other than those mentioned above in ob-

taining basically wholesome food to prepare for individuals in mass shelters; however, it was found advisable to keep a trained sanitarian on duty in each large shelter to assist kitchen personnel in handling food in a proper sanitary manner. We are confident that if this precaution had been neglected, one or more superimposed distressing disasters would have also occurred. It is notable that no outbreak of food poisoning did occur.

The special items which drew the attention of the sanitarians included insistence that food handlers be free from frank infectious disease in the form of skin infections, diarrhea, or acute upper respiratory infections. Insistence had to be placed on cold storage for suitable items of food. In some instances, measures had to be taken to prevent serving of inadequately prepared food (tenderized hams), to have cooked foods discarded within a suitable time limit, and to provide for adequate and thorough dishwashing procedures. The people preparing food were advised to avoid those items which are especially hazardous and especially notorious in leading to outbreaks of food poisoning. These included uncooked tenderized ham, poultry, starchy salads, cream puddings, or fillings for pastry.

Whenever possible, mothers and infants in mass shelters were segregated in a small room devoted to this purpose, and the number of visitors was held to a minimum. Local physicians agreed on a standard formula to be fed to all or nearly all of the bottle fed infants in the shelter, and careful attention was given to cleanliness in preparation of the bottles and formula. Most important was the use of terminal sterilization on the bottles. Adequate refrigeration was supplied in this area to suitably preserve the properly prepared and terminally sterilized bottles and formula.

PHASE TWO

The task of disposing of the unbelievably large quantities of refuse, animal wastes, and spoiled foods left as the flood waters receded placed the historic fifth labor of Hercules in diminished perspective. Surely the cleansing power of the Alphens and Peneus rivers on the Augean stables was not as great as that of the Kansas and Missouri in leaving behind massive amounts of decaying detritus. This problem was doubtless most severe in the stockyards area of Kansas City, where thousands of dead animals had to be removed and buried.

Foods of every description were destroyed or damaged by the flood waters, drug stocks in retail drug stores and in storage were damaged; something over 500 retail establishments suffered losses in excess of 95 per cent of their stocks. A general embargo order was placed on all food and drug stocks to prevent their removal, and they were subsequently inspected and processed or disposed of under the surveillance of health authorities. Railroads disposed of goods damaged while in transit in large sanitary land fills. Often entire freight cars with their contents were buried, since the decomposition of the contents made it impossible for the railroads to employ crews to clean the cars. Approximately $50,000 in grain was damaged beyond food use.

As a concomitant to the 1951 flood in Kansas, many thousands of individuals received injections of typhoid vaccine. While this measure is a customary and time honored one, its real need and efficacy is doubted. Our mental reservation is this—that the injection of the vaccine produces more morbidity than it prevents and that protection develops too late to be of benefit to those already exposed; it might prevent secondary cases in the event an outbreak did occur. It appears to us that the chance of flood waters or flood-contaminated waters containing typhoid organisms is exceedingly slim and would create a real hazard only in some of the backwashes of the flood. The amount of dilution of waste materials by flood waters is tremendous, and the mathematical probability of any individual acquiring typhoid organisms from the flood water is small.

On the other hand, the risk of acquiring various other enteric illnesses is by no means diminished through the administration of typhoid vaccine. Hence, it would appear that the effective steps to be taken for the prevention for the enterically transmitted disease is through the usual ones of insuring that the population has sanitary water and food supplies. Once begun anywhere in the flooded area, typhoid shots must be given in the entire area because of the public demand which arises. These injections not only produce minor illness in a fair share of the individuals who receive them, but occupy the time and attention and full energies of a large number of individuals engaged in performing the immunizations.

It is our belief the time and energy of these persons might have been much more effectively spent in other channels. Our only real reservation is that a more extended or widespread disaster might necessitate immunization protection, especially if insanitary water sources had to be used. In such event, the vaccine would have had to be given prior to the emergency for full effect.

It is notable that no case of human illness was directly traced to the effects of the flood. One small outbreak of septic sore throat did occur during the clean-up stages. A utility crew of 135 employees was placed in an area which had been flooded to check homes before gas service was resumed.

One of the members of this crew had a severe sore throat on the job, and approximately three days later 49 members of this crew were reported with nearly identical symptoms of sore throat and temperatures of 103 to 104 degrees. An epidemiological investigation showed that food for the crew had been supplied from a mobile unit of a local caterer. The methods of the caterer were good, and there was no indication that there was any food common in the cases of illness. Water was supplied to the crew by the gas company in 10-gallon milk cans with dippers. Paper cups were furnished with each water can. Supervisors in the crew admitted that the men had not used the paper cups but had drunk directly from the dippers; thus it appears that this outbreak was due to the use of common drinking cups.

CONCLUSIONS

Naturally occurring disasters in Kansas have been briefly described. They illustrate the need for good sanitation and disease control practices at all times, as well as showing the more acute needs which arise in the time of a disaster involving dislocation of numerous citizens and facilities. By inference, this paper points up the benefits to be derived from having trained public health personnel on hand to direct certain phases of disaster work. It offers the chance to plead that the number of such personnel in Kansas should not be so far depleted as to render the actions of the remainder comparatively inadequate and ineffectual.

Certainly the need is plain for community and state planning for disaster. Additional volunteers should be taught the elements of sanitation, especially food sanitation for mass feeding, and they should be available to augment and supplement the efforts of regularly employed sanitarians. The fact is shown that good sanitation and public health practices can remove the bogy of outbreaks of epidemic disease at the scene of naturally occurring disasters. The injunction of unnecessary and perhaps meddlesome though traditional measures is decried. The special needs of mothers and infants are mentioned.

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PRESIDENT'S PAGE

DEAR DOCTOR:

It was a pleasure and an opportunity for your president and executive secretary, as well as several members, to attend the dedication exercises for the Continuation Study Building at the University of Kansas Medical Center. The Kress Foundation, which gave $150,000 for the construction of this building, was represented by Mr. S. H. Kress himself. Mr. Kress made a short and very pointed address to the assembled group and then uncovered the cornerstone. Also present were about 15 businessmen from Greater Kansas City who had seen the need for this building and who had been most generous in their financial support.

The evolution of this building is most interesting, but limited space on this page prevents a complete portrayal of it. However, a brief résumé of the principal benefactors should be reviewed here. In addition to the contribution of the Kress Foundation, friends of the university living in the Greater Kansas City area have contributed $135,751. Mrs. E. H. Hashinger gave $100,000 for the Battenfeld Auditorium as a memorial to her son, J. R. Battenfeld, Jr. Friends of Dr. C. B. Francisco have contributed $30,554 as a memorial to him. About $60,000 has accumulated from student union dues, earnings of the book store, and contributions to a student union building, an endeavor which started back in about 1943. The alumni of the medical school and the doctors of Kansas have contributed another $26,000. The Endowment Association of the university has loaned the building fund $50,000. At this writing, these funds are available to finish construction on this building (about February 1, 1954) and to partly equip it. Another $60,000 is urgently needed to fully equip this building so that the maximum return in the form of usage and satisfaction can be realized by those who have been so generous in the interests of medical education in Kansas.

I believe that the quality of medical practice can well be judged by the quality and facilities for medical education in that state. The Kansas legislature has had the foresight to furnish these facilities at an undergraduate level. The aforementioned benefactors have been most generous in their support of the construction of this building which will not only enhance the pre-existing facilities as far as medical students are concerned but will also furnish a center for continued study for the doctors of Kansas and the United States. Is it not our responsibility to be generous in our contributions to carry this facility to its completion?

EDITORIAL COMMENT

KANSAS CIVIL DEFENSE ACT

The fourth in a series of editorials on legal subjects is devoted to the Kansas Civil Defense Act. This was passed in 1951 following considerable pressure from national sources because it was felt that the machinery for creating civil defense boards should exist in each state. It was also necessary to provide for inter-state co-operation in civil defense, both of which are accomplished by this act. It appears, for those interested in studying the subject further, in the 1951 supplement to the General Statutes of Kansas, 1949, and repeals certain pre-existing sections and rewrites the act into new sections 901 through 918.

The act begins with an expression of policy. "(a) Because of the existing and increasing possibility of the occurrence of disasters or emergencies of unprecedented size and destructiveness resulting from enemy attack, sabotage or other hostile action, and in order to insure that preparations of this state will be adequate to deal with such disasters or emergencies, and generally to provide for the common defense and to protect the public peace, health, and safety, and to preserve the lives and property of the people of the state, it is hereby found and declared to be necessary: (1) To create a state civil defense agency, and to authorize the creation of local organizations for civil defense in the political subdivisions of the state. (2) To provide for the rendering of mutual aid among the political subdivisions of the state, and with other states, and to co-operate with the federal government with respect to the carrying out of civil defense functions. (b) To authorize the establishment of such organizations and the taking of such steps as are necessary and appropriate to carry out the provisions of this act."

This act establishes the governor of the state as head of civil defense for Kansas and empowers him to employ a director of civil defense. He also may appoint a civil defense council and make available, when an emergency arises, any offices or officials of the state. It further permits counties of more than 175,000 population to levy a half mill tax in addition to all other levies for the purpose of civil defense and establishes that mutual aid arrangements may be made among the several counties.

The state civil defense council is authorized to accept services, gifts, grants, and loans from the federal government or from any private person or organization, to be used in time of disaster. The council is further empowered to requisition any property presently owned by the state or any of its political subdivisions and to transfer personnel for service in civil defense, should this be deemed necessary for the public interest and safety. There are provisions, of course, whereby contracts shall be entered into in such transfers, and that expendable materials shall be paid for or replaced according to prior agreement, and that personnel on loan for civil defense work shall do so only for the duration of the emergency.

A considerable portion of the act concerns personnel. One requirement is that no person may serve in any capacity in any civil defense organization who "advocates a change by force or violence in the constitutional form of the government of the United States or in this state or the overthrow of any government in the United States by force or violence, or who has been convicted of or is under indictment or information charging any subversive act against the United States."

There is also a section dealing with immunity from liability. It states that an individual who is injured or who suffers loss as a result of his activity in line of civil defense duty may recover benefits or compensation to which he would otherwise be entitled under Workmen's Compensation, any pension law, or any act of Congress, but, except for that, neither the state of Kansas, any of its political subdivisions, nor any individual serving therein may be held liable "for personal injury or property damage sustained by any person appointed or acting as a volunteer civil defense worker, or member of any agency engaged in civil defense activity." The only exception is for gross negligence, willful misconduct, or bad faith. This section goes to some length to flatly deny liability for any person in case of death or injury or damage to property as long as the person causing such injury has "complied with or reasonably attempted to comply with this act . . . during the existence of such emergency or grave public disaster."

In general, the act permits the governor to proclaim an emergency because of war, accidental or natural disaster. He may command the resources of the state in the interest of public health and safety and, as long as the emergency is declared to exist, the state is ruled under martial law. Even though the act attempts to define all possible emergencies, it is left open at the close by declaring that the civil defense director, who is responsible for all procedures under this act, may have whatever additional duties and responsibilities as may be prescribed by the governor or the council.

An Interpretation of Civil Defense

Civil defense is a game of cops and robbers. Grown men and women under tin hats playing hide and seek with an imaginary enemy, simulating monstrous disasters, rescuing an astronomical list of injured, assuming unbelievable authority, requisitioning everything in sight, running, screaming in the happy terror of comic book melodramas.

Until disaster strikes. Then the game with wooden swords pays off. The giddy dance sombers into black reality and a battle for survival—man's effort to save mankind. Then the party hours are transformed into experience teaching the actor lines he must recite upon the stage. Then he is prepared to take whatever comes upon him.

So, however scornful the cynic feels toward the exhilarated shipping clerk turned fire warden, let him play his little game. Let him learn his role of safety against such day, which God forbid shall ever dawn upon this nation, when his toys become instruments of salvation and his knowledge essential for survival.

For the doctor this is different. He isn't playing now, he won't play then. His service will be the same as it is today, but covering a wider field. Need for his skill will multiply a thousand fold. A Herculean task awaits him in which the luxuries of medical care must be discarded for essential work. Shortages will be magnified in personnel and material and in facilities. Handicaps of every description will plague him in an ever rising crescendo of abject and desperate need.

But he will be practicing medicine. The leisurely physical examination will be replaced by the fast excising of foreign material. The friendly advice on diet is put aside for an essential transfusion. History taking is discarded for a hasty x on the patient's forehead marking what has been done. Things will change in one fateful instant, but for the doctor this is a change in emphasis only.

If this happens, he must depend upon the aid of volunteer helpers, filling station attendants, truck drivers, fountain clerks, stenographers to perform the work of his skilled assistants. There is no time for training or for advice when the need arises. They must be ready now, so let them play at cops and robbers, learning what they may of first aid and disaster rescue during recreation periods against an hour when they might be needed.

So civil defense is not a game at all, but, instead, a deadly serious school to teach survival to a nation. It represents the final link between the civilian population and the armed forces, welded together into a chain of total defense. It is the people themselves learning to confront disaster, and, as such, no single hour of preparation can be said to be wasted even if happily the lessons learned are never needed.

And there also medical organization is essential. It would not be enough for the physician to be prepared to serve. He must be informed where he is needed and what duties he shall be expected to perform. Supplies in undreamed of amounts must be available for his use. Facilities must be prepared.

So this issue of the Journal is devoted to the subject of medical organization in civilian defense. It outlines recommended procedures which may well be modified according to various local situations but should be followed in the main to bring cohesion to the larger defense program.

And, finally, even though the prospect of need arising through enemy action is the hue and cry, a moment of sober reflection will convince each doctor that this outline can be made to serve in other ways. Local applications will conserve time and spare the maddening inefficiency of unpreparedness in case of disaster occasioned by natural or accidental causes. Actually, it is this service that presents an immediate practical aspect to such organization and represents the principal reason for devoting this issue of the Journal to the subject.

If a tornado or an explosion struck any city in this state, even a relatively small number of casualties would quickly overtax existing medical services. An appeal for aid would bring neighboring physicians of course, and, trained as they are to cope with emergencies, each would soon put his knowledge to effective use. But even this delay is unnecessary. With a small amount of organizational planning at this time the doctor does not need periods of practice. He needs only to accept an assignment. He needs to be made part of a team that can serve as a disaster unit. He will be more efficient, for whatever emergency duty he is asked to perform, if he is a member of an organized staff, if his partners in this effort represent the various specialized medical services.

So the plan is simple. Each sizable community should organize its own unit which would be prepared to move intact to any needed area. Smaller places may best group together. Today the plan is for a program to be placed on paper so that the blueprint may be used when occasion demands. It is that simple, but it is of utmost importance.

Our Debt

It has been recognized for many years that the tuition paid by the medical student is far short of the total expense necessary to prepare him for the practice of medicine. This deficit has had to be made up from other sources of income. Every graduate of

medicine should feel grateful that as a candidate for medical education he had the good fortune to be accepted by some medical school. As a medical embryo he was nurtured, developed, and taught the fine arts of the profession, qualifying him and finally conferring upon him the priceless degree of Doctor of Medicine.

However, he has not paid the full price of his medical education. There is still a responsibility for him to step forward and in a small way make it possible for the medical students of today to have the advantages of better education and better physical facilities than were offered to him. One should, of course, give financial assistance to the school of his birth, but there is also an obligation to the school of his adoption. We have enjoyed the practice of medicine in Kansas. Kansas is not my school by birth, but is my school by adoption.

Kansas medicine has accomplished great things. The Student Medical Union Building, Kansas City, is nearing completion. There is still some obligation to be met in the completion and furnishing of the same. It will be possible there to carry on more adequately, graduate as well as postgraduate studies. This new Kansas Medical Student Union Postgraduate Continuation Study Building will be dedicated to the students of medicine.

It is necessary for the profession of Kansas to assist in this very worthwhile project. The Endowment Committee is appealing to you to assist this project in this school of your birth as well as this school of your adoption.

J. W. Randell, M.D., Marysville
Chairman, Committee on Endowment

To supplement Dr. Randell's summary of the physician's obligation to contribute, the JOURNAL presents practical facts and figures to show the necessity for accumulating funds in Kansas and the uses to which they will be put. The information was assembled by Mr. Irvin E. Youngberg, executive secretary of the Kansas University Endowment Association. His balance sheet shows that funds have been accumulated through memorial contributions, student fees, grants, gifts from individuals, and income from investments.

The first memorial fund was established in the name of the late Dr. C. B. Francisco, who was especially active in the early part of the financial campaign. After his death in 1944, it was decided that the library and reading room in the new building should be dedicated as the Dr. C. B. Francisco Memorial Room.

A second memorial fund was originated by Mrs. E. H. Hashinger, who gave $100,000 through the Battenfeld Foundation as a memorial to her late son, Jesse R. Battenfeld, Jr. That contribution was marked for the Jesse R. Battenfeld, Jr., Memorial Auditorium in the new building.

Although there are no union building facilities at the medical center, all students there during the past four years have paid student union fees. In accordance with the statutes of Kansas, the full amount of those fees must be used for building and equipment until they are fully paid for.

The postgraduate program in medicine at the medical center was given impetus when the Kress Foundation gave $150,000 for the erection of a Continuation Study Building with the provision that the fund be matched by local contributors. Business firms and professional men of Greater Kansas City gave $135,750.95 to accomplish this end, and the Kansas University Endowment Association added $30,000 from its unrestricted funds for this purpose.

SERVICE SEPARATIONS

As a service to physicians and communities in this state desiring additional medical personnel, the Journal of the Kansas Medical Society will publish in this column each month the names of medical officers who will shortly be separated from the armed forces. These are men who volunteered from Kansas, and many of them will probably be interested in finding locations in this state. Anyone interested in contacting these physicians may write to the address here given.

John C. Artman, M.D.
2005 Lincoln Drive
Hays, Kansas

Laurel G. Case, M.D.
316 South Factory Street
Enterprise, Kansas

Thomas W. Critchfield, M.D.
4509 West 74th Place
Mission, Kansas

William T. Holland, M.D.
Winter VA Hospital
Topeka, Kansas

William J. Kridelbaugh, M.D.
Route 4, Radio Lane
Arkansas City, Kansas

James G. Lee, Jr., M.D.
731 Ann Avenue
Kansas City, Kansas

Hampton W. Shirer, M.D.
5321 West 50th Street
Mission, Kansas

All of the above contributions have been made to the Kansas University Endowment Association, which serves as trustee. The association invests the funds in short term government securities, making no administrative charge for the service. Income from the investments is added to the fund.

The following summary shows the status of the fund at present:

Battenfeld Foundation—Contributions		$100,000.00
Continuation Study Center—Student Union Fund		
Doctors' Contributions to date		26,040.16
Dr. C. B. Francisco Fund—Contributions		30,554.05
Special Fund—Kress and Kansas City Contributions		315,750.95
Medical Student Union Building Fund—Contributions		45,642.20
Student Fees		10,016.00
Income Earned to date		15,779.08
Loans From Kansas University Endowment Association		50,000.00
Total Available to date		$593,782.44
Expenditures to date		343,672.69
Cash (and Securities) on Hand		$250,109.75
Plus: Doctors' Pledges		2,200.00
		$252,309.75
Construction Costs	$538,788.68	
Paid to date	342,645.19	
Balance to be paid for Construction		196,143.49
Balance on Hand for Furnishings, Contingencies and Additional Change Orders		$ 56,166.26

Furnishings and equipment needs approximate $100,000, with about one-half allocated for the purchase of kitchen and dining room equipment. Kansas physicians are now being asked to contribute, and generosity may be encouraged by the fact that all gifts are deductible with respect to Kansas and federal income taxes. Special recognition will be given all who contribute $500 or more. A study of the endowment association records shows that 22 per cent of the physicians in the state have already made gifts to the fund, and it is hoped that the remaining 78 per cent will add their names to the list of contributors.

Armed Forces Requirements

A September 2 report from the National Advisory Committee to Selective Service, stating a belief that there will be no further calls for physicians registered under the doctor draft for about a year, was welcomed by physicians throughout the country.

The report adds: "As a result of Call No. 16 in August (for 524 physicians) and the increased number of volunteers, there have been commissioned a sufficient number of physicians to meet the needs of the armed forces for the immediate future. Those who have been commissioned from either the voluntary list or the Selective Service call will be brought to active duty from time to time until this reservoir is exhausted."

In summing up the situation, however, the *Journal of the American Medical Association* of September 5 carried an editorial criticizing the Selective Service System for refusing to cancel the August call for 524 physicians. The editorial stressed the fact that the number of physicians who have volunteered for active duty now far exceeds present medical officer requirements. Five long-range effects which will result from an excessive number of medical officers were listed as follows:

1. A wastage of medical manpower resulting in a reduction in the number of physicians available to care for the civilian population.

2. A tendency to use excess medical officers on nonmilitary assignments.

3. A squandering of available medical registrants under the "Doctor-Draft law" which would accelerate the call-up of doctors in priorities 3 and 4.

4. An inefficient utilization of physicians in uniform, with a resulting lowering of morale and general dissatisfaction with military service.

5. A nullification of the newly established ratio of 3.0 per thousand between medical and over-all troop strength.

The editorial presented the viewpoint of many physicians and communities as follows: "Acting in good faith and on the basis of the assertions by officials in Washington that medical personnel was sorely needed, many of these men have closed their offices or have discontinued their plans for additional residency or postgraduate training. In many instances this discontinuance of training was forced on them because of the prohibition that prevented hospitals from accepting priority 1 and 2 men to fill available residency vacancies.

"Having terminated their civilian commitments on the assumption that they were needed immediately by the armed forces, these physicians are now faced with the prospect of an indefinite status for the next year or more. Possibly it is still not too late for many of them to change their plans, to request a delay in call to active duty, and resume their civilian occupations.

"The government officials charged with the administration of the 'Doctor-Draft law' are obligated to call to active duty only those physicians who are needed and immediately to advise medical reservists as well as Selective Service medical registrants when they can expect to be called for military service."

BLUE SHIELD

Keeping People Informed

The problem of how much and what kind of printed matter should be used by Blue Cross and Blue Shield is one which always presents a challenge. Does the public like to see new and fresh material, or does it tire of it? Is enough money spent on this kind of publicity, or should the amount be increased? These are questions not easily answered. The Public Relations Division of the Kansas Plans tries to maintain public interest without too much repetition.

In an effort to keep in constant touch with the sponsors and users of Blue Cross-Blue Shield, the monthly publication *Health Plan* is sent to four different groups. This is sent to doctors, hospitals, member council representatives, and group leaders, with a slight difference in the content of the inside pages, designed to be of particular interest to each group. Being the principal method of communication between the Blue Cross-Blue Shield staff and the medical profession, it merits the continued interest and attention of Kansas doctors. These pages contain stories of the activities of the medical society, the medical auxiliary, the medical assistants and the Blue Shield Relations Committees. This offers a convenient way for the Kansas doctor to keep in touch with the development and progress of Blue Cross-Blue Shield. A quarterly edition of *Health Plan* is sent to all direct pay members. These are members who have joined during a community enrollment or have transferred out of an employee group. Thus the communication reaches or is made available to nearly the entire Kansas enrollment.

The newest piece of literature to reach the desk of the Kansas participating physician is "The Tearful Tale of the Other Fellow," a small descriptive folder with a detachable card which can be mailed to the central office for information regarding membership, or group formation. A small supply will be mailed to each physician, and additional copies will be sent on request. Placed on the receptionist's desk in the outer office, they offer patients a chance to examine the possibilities of membership in the two plans.

A second leaflet will soon be mailed—only two copies to an office. This is designed to answer questions concerning the patient's coverage under the plans and will be given to him on entering the hospital for treatment. General information, with answers to 50 questions commonly asked, will save the doctor's time and give the patient an idea of what he can expect in the way of service from his Blue Cross-Blue Shield membership. He can also become aware of the relationship between the dues he pays and the costs of hospital, surgical, and medical service. When he understands their dependence on each other, he may be less willing to use more of the services than absolutely necessary, thus eliminating the possibility of increased rates.

Another item recently mailed was a participating physician plaque and desk card. These should serve as a reminder to the patient to tell the office assistant that he has membership in Blue Shield.

During the years, numerous different kinds of literature have been mailed to members in the form of stuffers in monthly statements and in notices of payment. Quarterly posters are placed in hospital lobbies and folders distributed during enrollment campaigns. Advertising by newspaper, radio, and magazine is conducted through most of the year, but particularly during enrollments.

A practical demonstration of the value of direct mail advertising is the satisfactory result of the recent offering of an extended benefits rider to the existing contract. A concentrated mail campaign within a two-week period resulted in approximately 175,000 members enrolling in this added service. Protection is assured to $5,000 in each service against the cost of treatment for poliomyelitis and certain other stated diseases, or a total of $10,000 which could be available for each member of the family who is covered.

Since total income of the plans is a major factor in determining how much should be spent, it is interesting to know that the present cost of this kind of public relations project (printed matter) represents an expenditure of less than 1 per cent of Blue Cross-Blue Shield income.

"Americans can expect to add four or five years to their average length of life during the next 20 or 25 years," said Dr. Louis I. Dublin, consultant to the Institute of Life Insurance, recently.

"During the past half-century, life expectation at birth has jumped from about 49 years to the present 69 years. That was in large part the result of great reductions in mortality among infants, children, and young adults. Longevity at middle ages and at advanced ages has not gained materially in the recent past. But today, with research concentrated on the ills which beset later life, there should be material advances in the years ahead in life expectancy in mid-life and later."

The 95th annual meeting of the Kansas Medical Society will be held at Topeka, May 2-6, 1954.

Clinical Pathological Conference*

CASE PRESENTATION

Dr. John Christianson (resident in medicine): This 42-year-old obese colored female was first seen in the emergency room of the University of Kansas Medical Center on April 26, 1953, and expired April 27, 1953. The chief complaint was an attack of asthma for six hours.

The patient developed this asthmatic attack about noon. The attack became progressively worse, and the patient came to the emergency room for treatment at 7:10 p. m. She gave a history of seasonal asthma for 15 years. The family history is unknown.

When first seen, the patient had severe dyspnea and a wheezing respiration, with short inspiratory phase and prolonged expiratory phase. Blood pressure was 120/70, pulse 100. Two minims of adrenalin were given at 7:15 p. m. and repeated at 7:35 p. m., with little effect. At 8:00 p. m., 7½ grains of aminophylline were given intravenously, with some relief. This was repeated at 9:00 p. m., with almost total relief of symptoms. There still were a few expiratory high-pitched wheezes posteriorly.

The patient was released from the emergency room essentially clear at 11:00 p. m.

The patient was readmitted to the emergency room at 4:25 a. m. on April 27, 1953, in a severe asthmatic attack which started about 2:00 a. m. Chest examination was the same as on the previous admission. Two minims of adrenalin were administered at 4:27 a. m. Oxygen by mask was administered, at a rate of eight liters a minute. Adrenalin ½ cc. was given at 4:46 a. m. Aminophylline grains 7½ intravenously was given at 5:00 a. m. Sodium phenobarbital grains 1½ was given intramuscularly at 5:30 a. m.

In spite of therapy the patient continued to have great respiratory difficulty. She was extremely restless and fought the oxygen mask. She then began to show signs of stupor. At 6:25 a. m., 200 mgm. of cortisone was given intramuscularly in the buttocks in divided doses.

Blood pressure was unobtainable at 6:45 a. m. Femoral and radial pulse was unobtainable. The lungs were essentially clear anteriorly. The patient was unconscious. Tracheal suction obtained little secretion. The patient was placed in shock position, and a vein was exposed surgically at 7:20 a. m. Twenty mgm. ACTH in 500 cc. of five per cent glucose in water was started at 60 drops per minute. Two cc. nor-epinephrine in 500 cc. of five per cent glucose in water was added and flow reduced to 30 drops per minute.

At 8:00 a. m., no radial pulse was obtainable in either arm. Femoral pulse obtained at 8:30 a. m. was fairly strong—rate 136/minute. An electrocardiograph was done.

At 8:50 a. m. the patient was transferred to a bed and moved to the ward, with continuing intravenous medication. At 9:05 a. m. the patient vomited. Respirations and respiratory effort ceased immediately.

Large amounts of vomitus were suctioned from the pharynx. Two cc. adrenalin and 1½ cc. coramine were administered intracardially. The patient was pronounced dead at 9:10 a. m.

Dr. Mahlon Delp, chairman: Any questions of Dr. Christianson?

Q: At any time during her hospital course did this patient produce any sputum?

Dr. Christianson: No.

Q: What was the character of the vomitus?

Dr. Christianson: It was gastric contents.

Q: Was she cyanotic at any time?

Dr. Christianson: It was difficult to determine. I think she was quite cyanotic, from the appearance of the fingernails.

Q: How long was the oxygen kept on?

Dr. Christianson: From the time it was started, at about 4:30 a. m., until time of death. We tried to cut off the oxygen periodically. It was given continuously when the cyanosis became more marked.

Q: Was an x-ray made?

Dr. Christianson: No.

Q: Was respiration thoracic or only abdominal?

Dr. Christianson: She was using her chest muscles for respiration. There was some in-drawing.

Q: Did you say the vomiting was agonal vomiting?

Dr. Christianson: It depends upon how you interpret the word "agonal." Yes, I would say the vomiting was agonal.

Dr. Delp: Do you think the respiratory excursions ceased simultaneously with the vomiting?

Dr. Christianson: I think the patient vomited, and then respirations ceased immediately.

Dr. Delp: You make a point of the fact that the patient had no visible respiratory excursions following the vomiting? No additional effort?

Dr. Christianson: That's right.

Q: What was the nature of the respiratory excursions before the vomiting?

* From the University of Kansas Medical Center. Edited by Glen R. Shepherd, M.D., and Mahlon H. Delp, M.D., from recordings of the conference participated in by the Departments of Medicine and Pathology and the junior and senior classes of medical students.

Dr. Christianson: They were shallow, but they were evidently adequate.

Q: Did you auscultate her chest?

Dr. Christianson: It was clear anteriorly upon arrival at the ward.

Q: How much did this patient weigh?

Dr. Christianson: About 160 pounds.

Dr. Delp: Did you have any particular reason for taking the EKG?

Dr. Christianson: Yes. I couldn't understand why I couldn't get the radial pulse or the blood pressure, and yet I could faintly hear heartbeats.

Dr. Delp: Mr. Manning, you have the EKG, I believe.

Mr. Robert Manning (senior student): The rate is regular with tachycardia of approximately 150. The auricular conduction was normal with P waves preceding each ventricular complex. Therefore, this is a sinus tachycardia. The Q-T interval is shortened but, when corrected for the tachycardia, it is within normal limits. The P-R interval is prolonged mainly because of the large P complex. QRS complex appears normal, and the T vector itself is located almost perpendicular (-90°) to the coronal plane, so you don't see much T wave deflection on the chest leads. The QRS vector is perpendicular to lead aVl (about plus 60°) and is directed anteriorly so that the main findings are the rotation of the QRS and T vectors with wide QRS-T angle and the large P waves. These findings are consistent with acute right ventricular strain.

Dr. Delp: You can see the EKG, Dr. Gunn. Does it appear to suggest any acute myocardial condition?

Dr. C. G. Gunn (resident in medicine): No, there is nothing there that suggests heart disease.

Dr. Delp: There was nothing in this patient's history or appearance that suggested heart disease to you, Dr. Christianson?

Dr. Christianson: I needed any help I could get.

Dr. Delp: Were you considering a pulmonary embolus or pulmonary infarct?

Dr. Christianson: No.

Dr. Delp: It would seem that this patient had bronchial asthma in a severe form in the past. That is not the answer to the responsibility and obligation we have in this academic exercise because patients don't often die of bronchial asthma, and so we have to offer some other explanation for this patient's death.

I don't mean the immediate, obvious thing that occurred at the bedside just prior to the patient's death. I think we still have to explain the patient's clinical appearance, especially after the last time she came to the emergency room—the peculiar cardiovascular collapse or shock state that she manifested.

Miss Shiney, may we have your differential diagnosis?

DIFFERENTIAL DIAGNOSIS

Miss Margaret Shiney (senior student): Today we are confronted with the case of a 42-year-old woman having a history of seasonal asthma and a terminal episode consisting of about 18 hours of relatively intractable dyspnea, wheezing, and cyanosis.

Since the symptoms were typically asthmatic, I believe the differential diagnosis must consist of both asthma and conditions simulating asthma. The four categories of conditions simulating asthma are respiratory disease, circulatory disease, renal disease, and nervous system disease.

In diseases of the respiratory system are included pharyngeal disease, including such things as spasm, edema, paralysis, inflammation, stenosis, the presence of a foreign body, and neoplasms.

Tracheobronchial disease which may cause asthmatic-like symptoms includes intrinsic lesions such as acute and chronic bronchitis, chronic inflammatory disease such as bronchiectasis, tuberculosis, syphilis, foreign bodies, and neoplasms. We must think also of the extrinsic lesions such as substernal thyroid enlargement, aneurysm of the thoracic aorta, tuberculosis of the tracheobronchial nodes, and mediastinal neoplasm.

We must consider also parenchymal pulmonary diseases. The most important of these are the inflammatory diseases such as pneumonia, tuberculosis, and pneumoconiosis. We must consider idiopathic pulmonary emphysema, neoplasm of the lung parenchyma or pleura, and things producing external pressure, such as pneumothorax or hydrothorax.

Among circulatory causes for asthmatic-like attacks, the most common is cardiac decompensation.

However, I feel that this case is to be explained solely on the basis of true asthma. There is a history of seasonal asthma present at least since the age of 27. On this basis alone, I think that we can make the diagnosis of atopic asthma. But because status asthmaticus is rare in this condition and because atopic asthma typically becomes less severe with age, I believe we must postulate another disease process which is either inflammatory and infectious or which is very debilitating.

It is possible also that the patient's extrinsic asthma—atopic asthma—was complicated by the intrinsic type which has numerous causes, including somatic and psychic conditions, primary emphysema, and neoplasms. It is not possible to rule out most of the causes from the information we have.

However, working on the principle that the simplest diagnosis probably is the best, my final diagnosis is atopic asthma complicated by some unknown disease which is infectious or debilitating. I believe that the patient went into shock from anoxia which was caused not only by the asthma but also

by some other disease which must have been present in the thorax.

Dr. Delp: I'd like to have you state some infectious diseases that might have existed, or offer us a better explanation.

Miss Shiney: I can't offer a better explanation. I can think of coexisting pneumonia, coexisting tuberculosis, and atelectasis. I can think of any number of things it might have been.

Dr. Delp: Could you offer any metabolic explanation for a shock state such as this patient had?

Miss Shiney: It is feasible that the adrenal cortex had been depleted. I don't have any reason for thinking it. I know that she was anoxic to the point of circulatory collapse, and therefore I feel safer in suggesting that her circulatory collapse was due to anoxia.

Dr. Delp: I think you heard Dr. Christianson say this patient received oxygen almost continuously for a period of 4½ hours. He tried to interrupt it, and that did not work. Then he said the patient became comatose. Does that suggest anything to you?

Miss Shiney: It is possible that by giving her oxygen we removed the only stimulus the respiratory system had. Actually, hypoxia stimulates the respiratory system, and oxygen in excess might remove one valuable stimulating mechanism with resultant slowing of the respiratory rhythm and carbon dioxide retention. This situation could result in fatality.

Dr. Delp: Are there any comments?

Dr. T. K. Lin (instructor in medicine): Did the heart beats stop with the vomiting?

Dr. Christianson: No, the heart continued for a few minutes after the vomiting.

Dr. Delp: I'd like to alter our routine just a little today and have the pathologists tell us what they found in this case. We will discuss it further after that.

Does anyone have a diagnosis he would like to make now?

PATHOLOGY REPORT

Dr. J. K. Frenkel (assistant professor of pathology): When the body was opened, the lungs were found to be large and voluminous, filling the chest cavity completely, in contrast to the tendency of normal lungs to collapse after opening of the chest. Although some pleural adhesions were present, failure of the lungs to collapse was due principally to a large amount of trapped air.

Sections showed marked diffuse emphysema. The trachea and main stem bronchi contained aspirated gastric contents. The smaller bronchi contained thick, tenacious, yellowish mucoid exudate.

Microscopically, the presence of a recent purulent exudate was confirmed. In the exudate as well as in the bronchiolar mucosa, eosinophile granulocytes and mononuclear cells were numerous. Hyaline degeneration of the basement membrane of the bronchial mucosa was present, reaching up to 50 microns in thickness.

The clinical diagnosis of chronic bronchial asthma was therefore fully confirmed, with a predominance of emphysematous alveoli and a lack of atelectasis. Some fibrosis of the pulmonary parenchyma was present, however.

The lungs weighed 250 grams on the right and 220 grams on the left. The heart was slightly enlarged (350 grams), the enlargement being equally on the right and on the left, and there was no clear-cut cor pulmonale.

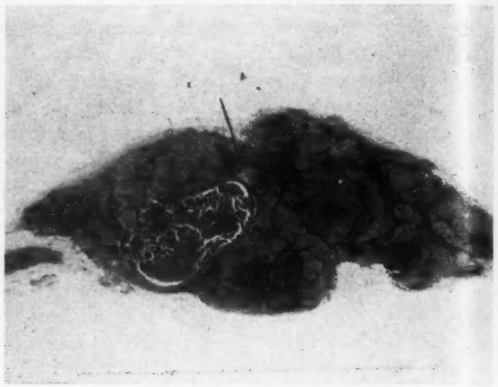

Figure 1. Cross sectional view of adrenal gland showing generalized nodularity due to granuloma formation and necrosis (magnification 4.5x). Shown on Figure 2, an enlargement of area near arrow.

The unexpected anatomical findings were in the adrenal glands, which showed marked nodularity associated with necrosis (Figure 1). Together they

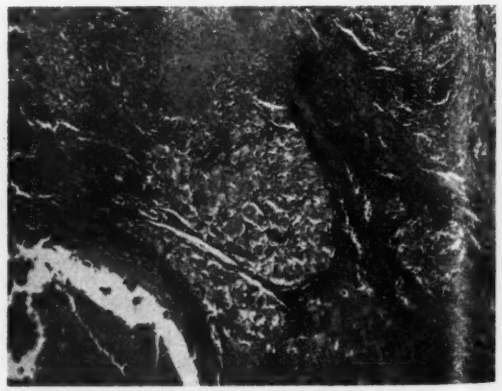

Figure 2. Low power of area near arrow on Figure 1, showing a group of hyperplastic cortical cells, the only cortical cells in this section (center). Granulomatous inflammation is present peripherally; necrosis is shown in the left lower corner and top center.

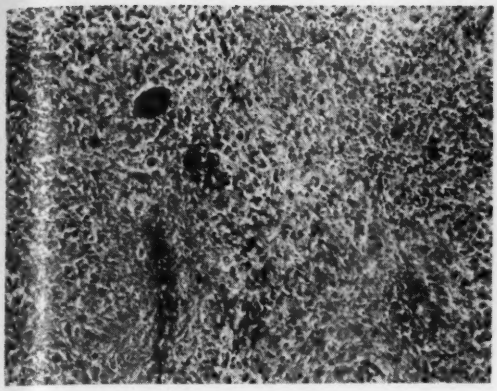

Figure 3. High power view of epithelioid reaction with giant cell and necrosis (granulomatous inflammation).

weighed 15 grams, which is slightly more than average. Most of each gland had a granulomatous inflammatory process characterized by epithelioid cells, formations of tuberculoid giant cells accompanied by necrosis (Figure 3), and the presence of acid-fast bacilli. Very little cortical tissue remained; it appeared hyperplastic, and the cells were devoid of lipoid vacuoles (Figure 2). Recent tubercles also were present in liver and spleen, and a retroperitoneal lymph node showed granulomatous involvement with caseation necrosis. A scarred lesion was present in the apex of the left lung, suggestive of reinfection type tuberculosis.

The adrenal lesions appear to be of short duration, and necrosis of the adrenal gland probably occurred within a matter of weeks or months. We might speak here of clinically latent tuberculosis of the adrenal glands, since the clinical syndrome of Addison's disease was not apparent, unless the events of the last day could be interpreted as an Addisonian crisis. However, from secondary endocrine changes, there was evidence of adrenal cortical hypofunction. We found almost complete absence of the ACTH-secreting basophile cells in the pituitary gland. This finding is said to be commonly associated with Addison's disease; its genesis is obscure. A decrease in numbers of pituitary basophiles could result, after temporary accumulation of hormone material, from the dropping out of the target cells in the adrenal cortex.

Another indication of endocrine hypofunction was the presence of atrophic ovaries and of a flat and relatively aglandular endometrium. This, again, can be related to the sparseness of the pituitary basophiles which secrete the follicle stimulating hormone as well. These findings suggest endocrine hypofunction, persisting at least for a short time. Unfortunately, there was no history of weight loss, weakness, gastric irritability, or sensitivity to cold; nor could biochemical changes in blood and urine be determined. The patient was moderately obese, indicating that adrenocortical deficiency probably was not of long standing. There was no thymic enlargement (two grams) nor lymphoid hyperplasia, which occasionally accompany Addison's disease.

The occurrence together of bronchial asthma and adrenal insufficiency deserves special consideration. On one hand, due to adrenal insufficiency, the patient might be more sensitive to a stimulus initiating bronchial asthma; the attack ensuing thereafter might be more severe, due to lack of adrenocortical hormone. On the other hand, the stress of bronchial asthma and its associated bronchitis would be greater with relative adrenal insufficiency and might therefore push the patient into uncompensated adrenal insufficiency. We then have a vicious circle—one condition aggravating another.

As for the terminal incident: We mentioned the aspiration of gastric secretions which was observed at autopsy and corroborated by the history.

CLINICAL DISCUSSION

Dr. Delp: In Dr. Frenkel's remarks there are a couple of things we should explore. First of all, I think we should try to establish whether or not this fits into the definition of status asthmaticus. If so, what more successful management could be used?

Next, since the obvious destruction and damage to the adrenals has been established, I would like to hear some discussion as to whether or not there is a legitimate adrenal apoplexy or an acute adrenal insufficiency that might have a background in such a situation as Dr. Frenkel has demonstrated here.

I would like to ask Dr. Withers how he might have managed this patient if he thinks this clinically fits the diagnosis of status asthmaticus.

Dr. O. R. Withers (associate clinical professor of

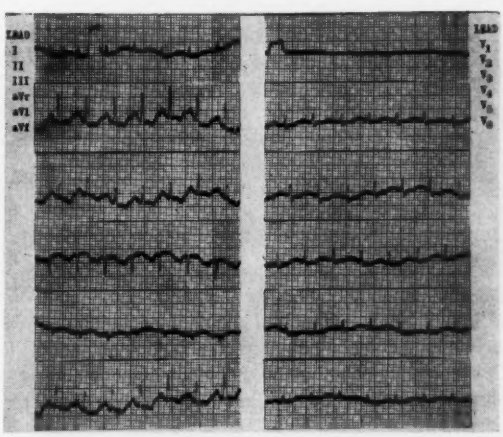

Figure 4. Sinus tachycardia, rate 150. Depression of the S-T segments in leads I, II, III, and aVF plus V_3 through V_5 could be associated with tachycardia or shock.

medicine): There's a very interesting thing about this case. In the first place, I doubt very much that this reaction the patient had in the lungs was a seasonal affair.

That type of individual rarely, if ever, goes into status asthmaticus. The history that the patient had asthma recurrently, just seasonally, does not agree with the pathology report showing very definitely that the asthma was on a chronic basis. And the patient had had it for several years, as shown by the fibrosis in her lungs.

Furthermore, I am inclined to believe that the adrenal insufficiency she had might have had something to do with the acuteness of her last attack.

Now, let's forget the pathology report. If this was due to a seasonal situation, the only thing that I think would throw her into an attack like this would be that she was extremely sensitive to certain allergens. I have seen it happen from aspirin.

A lot of these people take drugs before they are seen—somebody suggests this, and somebody suggests that. The patient then suffers from the toxic effects of drugs or from allergic reactions to drugs.

The second possibility is that some become adrenalin-fast, simulating a status asthmaticus. That is a broad term which means many things. In general, it means that everything you have given the patient has failed to cause a return of normal respiration.

In some cases, continuing to give adrenalin causes a paroxysm—a paradoxical effect. This could have been a factor here.

We didn't know about the adrenal gland insufficiency. As has been brought out, it's very likely that this is a possibility for lowered threshold for allergic reaction and also may have caused the attack to be more severe.

Dr. Delp: Dr. Bolinger?

Dr. Robert E. Bolinger (associate professor of medicine): Of course, we can say that this patient had adrenal insufficiency at the time the attending physician saw her, but probably it would have been a little difficult to make that diagnosis.

In a condition of severe stress, probably it is best to assume that the patient has a relative adrenal insufficiency, even in the presence of a normal adrenal gland. I think that is one situation we must consider in the patient in so-called "medical shock." This patient's terminal phase represents medical shock, with the drop in blood pressure and evidence of peripheral vascular collapse.

One thing that must be considered as a predisposing factor for this situation is a fulminating septicemia of some kind. How does a fulminating septicemia produce such a picture that frequently goes on to pulmonary edema and death?

One mechanism has been suggested, in the form of adrenal apoplexy. I don't know that the term "adrenal apoplexy" is particularly apropos. Certainly it is possible in a severe stress state, in severe infection, for a relative adrenal insufficiency to exist. It has been shown that the requirements for cortisone during such an infectious stress state may go up 10 to 20 fold, probably due to an increased metabolism of cortisone rather than to a lack of production. The insufficiency which then results could develop even without any disease of the adrenals. This patient might have had the same picture without any disease in the adrenals.

The adrenal can be stimulated only to a certain point. Thorn and his workers have shown that the response of the adrenals to ACTH follows a sigmoid type of curve which flattens off at the top; that if you give ACTH up to a certain amount, the response curve flattens off at the top. So there is a limit to the amount of the corticoids which the adrenals can put out. I think that when that limit is reached, as it frequently is in severe stress states, it would be quite reasonable to say that the patient had a relative adrenal insufficiency.

As far as "adrenal apoplexy" goes—I don't like that term. Apoplexy usually is applied to vascular accidents, and I think that if the adrenal were going into apoplexy as the result of overstimulation, it would do so as the result of our treatment more often than not, because we give ACTH in doses which far exceed the capacity of the adrenals to respond.

True apoplexy of the adrenals occurs in fulminating infections of the Waterhouse-Friderichsen type. There are some arguments about how those accidents come about. They can be explained on the basis of the actual effect of the infection on the adrenals.

One point remains in this case. The patient was given cortisone intramuscularly some 12 hours after admission, and also ACTH, which we can see now would not have caused any response. In the patient in an acute peripheral vascular collapse state, one should use an intravenous preparation—aqueous adrenal cortical extract. It shouldn't be given in a dose of one ampule; you ought to give ten ampules. The amount of cortisone contained in 100 cc. is very small, but it does have an effect, whereas intramuscular cortisone probably had no effect within a reasonable time limit.

Dr. Delp: Dr. Frenkel, from those sections, do you think this patient had a chance to recover, providing the asthma could have been controlled? Do you think those adrenals would ever have been functional again?

Dr. Frenkel: I doubt that the adrenals could have become functional again, since the tuberculous

process probably would have destroyed whatever adrenal tissue might have regenerated.

Perhaps a combination of antitubercular therapy covered by small replacement doses of cortisone could have been tried, had the diagnosis been known. I don't know what would have happened, since the tuberculous process would have been accentuated by larger doses of cortisone had the patient lived. Such large doses might have been necessary initially to maintain life.

I have just one comment about the effect of infection on the adrenal in causing "adrenal apoplexy." I believe that this is mediated through the pituitary-ACTH mechanism, with the infection providing the stress. Bacteria probably do not lodge in the adrenal gland in the Waterhouse-Friderichsen syndrome. In guinea pigs, "apoplexy" can be produced when diphtheria toxin is injected. Intense stress, or overadministration of ACTH, can cause dissolution of adrenocortical cells accompanied by hemorrhage. Hence, administration of ACTH to this patient would have been useless and might even have precipitated a crisis in an adrenal gland already under stress.

Actual involvement of the adrenal with microorganisms such as the tubercle bacillus, histoplasma, torula, toxoplasma, and others is more likely to lead to necrosis with karyorrhexis, sometimes associated with hemorrhage.

SUMMARY

Dr. Delp: Death in a given acute episode of bronchial asthma is uncommon but not rare. The combination of status asthmaticus with adrenocortical destruction due to active tuberculosis surely is unusual.

Cortisone given promptly to this patient might well have eliminated the paroxysm of asthma and prevented the profound and fatal cardiovascular collapse state. Long-term management of the patient then would have posed another problem.

FINAL DIAGNOSES

Primary

ASTHMA (history of asthma for 15 years and status asthmaticus for 6 hours before death).

CASEOUS TUBERCULOSIS OF BOTH ADRENAL GLANDS and of retroperitoneal lymph node near inferior vena cava.

MULTIPLE TUBERCLES OF LIVER AND SPLEEN.

Fibrous nodules of periphery of middle lobe of right lung and lower lobe of left lung, and fibrocaseous tracheobronchial lymph node.

Fibrous thickening of pleura and calcified subpleural nodule of apex of upper lobe of left lung.

Fibrous pleural adhesions of all lobes of both lungs.

Focal subendocardial hemorrhage of left ventricle.

Recent surgical wound of left forearm (history of exposure of vein for intravenous infusion 2 hours before death).

Multiple recent puncture wounds of both arms (history of multiple intravenous and intramuscular injections for 4 hours before death).

Aspiration of gastric contents into trachea and main bronchi, recent.

Accessory

Arteriosclerosis of aorta and coronary arteries, slight.

Sclerosis of mitral valve, slight.

Fibrous pericardial adhesions.

Obesity, moderate (height 62 inches, weight 150 pounds).

Fatty metamorphosis of the liver, slight.

Fatty infiltration of myocardium, slight.

Chronic gastritis with congestion and focal hemorrhage.

Chronic salpingitis.

Fibrous peritoneal adhesions between omentum and abdominal wall, liver, spleen, diaphragm, gallbladder, and colon, and between loops of ileum in lower abdomen.

Atrophy of ovaries and uterus.

Chronic cervicitis.

Chronic vaginitis.

Oleogranulomas of the spleen.

Accessory spleen (1).

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O'Donnell, Ward J.; Fajans, Stefan S.; and Weinbaum, Jack G.: Human adrenal cortex after administration of ACTH and cortisone, Arch. Int. Med. 88:28-35 (July) 1951.

ORIENTATION COURSE AT K.U.

An orientation course for freshman students at the University of Kansas School of Medicine was held this year for the first time. The course was given on the Lawrence campus during the third week of September, prior to the opening of regular classes.

A feature of the course was a banquet held on September 16, attended by the entire faculty of the medical school, all freshman students, and their wives. Speakers for the banquet program were Dr. Lucien R. Pyle, Topeka, president of the Kansas Medical Society, and Mr. Clarence G. Munns, Topeka.

Good public relations for the medical profession begins in the office of each individual physician.

Osteopathic Practice Rights

During the final hours of the 1953 Kansas legislature, the following resolution was adopted by both houses, and a copy was subsequently sent to this office.

HOUSE CONCURRENT RESOLUTION NO. 29

A Concurrent Resolution providing for a study, report and recommendations relating to the practice of medicine and osteopathy in this state.

Be it resolved by the House of Representatives of the State of Kansas, the Senate concurring therein: The Kansas medical society and the Kansas osteopathic association are hereby requested to immediately proceed to evolve a permanent solution to the problems of licensure and practice rights of doctors of medicine and doctors of osteopathy in the state of Kansas and to present to the 1955 session of the Kansas legislature a proposed solution to these problems. Said osteopathic association and medical society shall have the full cooperation and assistance of all the state agencies in carrying on its study and in preparing its report.

Be it further resolved, That enrolled copies of this resolution shall be submitted to the chairman and secretary of the Kansas medical society and Kansas osteopathic association.

(Adopted by the House and the Senate)

On Thursday, May 7, the president of the Kansas Medical Society read to the House of Delegates the following resolution which he had received by mail during the annual session.

RESOLUTION BY THE KANSAS STATE OSTEOPATHIC ASSOCIATION

Whereas, the Kansas State Osteopathic Association recognizes the importance of Concurrent Resolution No. 29 passed by the 1953 Session of the Kansas Legislature relating to the permanent solution to the problems of licensure and practice rights of doctors of medicine and doctors of osteopathy in the state of Kansas, and

Whereas, the legislative resolution requested the Kansas State Osteopathic Association and the Kansas Medical Society to proceed to evolve a permanent solution to the problems of licensure and practice rights of doctors of medicine and doctors of osteopathy in the state of Kansas.

Be It Therefore Resolved that the Kansas State Osteopathic Association pledges itself to full cooperation with the Kansas Medical Society and with all interested state agencies in working out before 1955 a plan for permanent solution to the problems of licensure and practice rights of doctors of medicine and doctors of osteopathy in the state of Kansas to be offered to the 1955 session of the Kansas Legislature for its study and action.

Adopted by the Kansas State Osteopathic Association this 26th day of April, 1953.

(Signed) Lloyd L. Hall
Executive Secretary, K. S. O. A.
(Corporate Seal of The Kansas State Osteopathic Association)

After some discussion the House of Delegates decided the basic principles upon which the future course of this Society should be directed and then authorized the Council to draft a reply. Correspondence upon this subject was carried on with the Council during the summer and, on September 4, 1953, the following letter was sent by L. R. Pyle, M.D., president of the Kansas Medical Society, to the president of the Kansas State Osteopathic Association.

REPLY BY THE KANSAS MEDICAL SOCIETY

E. A. Rindt, D.O., President
Kansas State Osteopathic Association
Garlinghouse Building
Topeka, Kansas
Dear Doctor Rindt:

We wish to acknowledge receipt of the resolution adopted by the Kansas State Osteopathic Association relative to practice privileges in Kansas. This was read before the House of Delegates of The Kansas Medical Society and discussed at some length.

If this resolution was correctly interpreted by The Kansas Medical Society, we are in accord with all portions except in one relatively minor instance which, we recognize, was taken from the resolution adopted by the Kansas Legislature. This suggests the need for a "permanent solution to the problems of licensure and practice rights of doctors of medicine. . . ."

There exist certain statutory problems relative to licensing doctors of medicine which result from the fact that the medical practice act has not been amended substantially during the past 40 years. Statutory educational requirements for the practice of medicine and surgery are below those currently in force on the basis of regulations adopted by the Kansas State Board of Medical Registration and Examination. Existing standards might well be classified into the medical practice act statute but since these are already operative under board regulations, none of which exact less than the law, we do not believe there is laxity in the present situation.

The principal difference of opinion between the doctors of medicine and the authors of your resolution, as expressed by our House of Delegates, concerns the statement that the practice rights of

doctors of medicine require a "permanent solution."

If a practical and equitable means might be devised to govern the practice of medicine and surgery which would afford adequate protection for the public against unqualified practitioners, then there would be no essential disagreement even on this point.

We are sure your association will agree that laws governing the practice of the healing arts exist for no purpose other than for the protection of the public. Certainly they should never operate for the benefit of any individual or group of practitioners. It is the opinion of The Kansas Medical Society that present statutes and regulations governing the practice of medicine and surgery in Kansas currently serve to offer protection for the public against inadequate and unskilled practitioners in these fields. While never eradicating the variation of talents and abilities, nevertheless they provide a minimum standard of educational experience. In the public interest we would not oppose any better way for raising statutory standards applicable to all healing groups and certainly no sincere association could conscientiously advocate lowering this protection.

During the many years osteopathy held to the beliefs of its founder and decried the use of drugs and the practice of operative surgery in the practice of healing, there was relatively little problem between our two professions as to the rights of practice. The controversy arose in recent years after the original concepts of osteopathy were discarded and osteopathic physicians began to want to use drugs and to practice operative surgery.

At that time the medical profession declared that educational requirements of the schools of osteopathy should be equivalent to those of medicine before their graduates might be licensed to practice in medicine and surgery. That continues to be the position of our society today.

We are certain you recognize the incongruity of adopting separate laws containing conflicting requirements to cover one subject. We are also certain that your association agrees with us that the highest educational standards must be maintained for public protection. Therefore, we endorse the principles expressed in the resolution you sent to us.

Press releases, especially your personal statement, as president of the Kansas State Osteopathic Association, arising out of your recent meeting in Kansas City, were of particular interest. .Your remark that osteopathy would "settle for nothing less than unlimited practice rights. . . ." represents, we believe, a definite progressive step on the part of your association. We welcome this expression because we have always believed that any profession desiring to practice medicine and surgery should educationally qualify its members through basic and other training to engage in any phase of that practice.

The Kansas State Osteopathic Association has long contended that osteopathic educational requirements equaled those of the medical profession. The special resolution passed by the 1953 Kansas Legislature affords you the assistance of Kansas facilities in establishing the educational qualifications of your schools. As you know, it has long been our opinion that only after satisfactory evidence has been presented as to osteopathic educational standards in the fields of medicine and operative surgery could the State of Kansas justify the extension of such practice privileges to the members of your profession. We hope this is what you have in mind and, if so, we shall be happy to offer you assistance and to pledge our co-operation toward the end that such an evaluation may be accomplished speedily and in a fair and efficient manner.

Because of our sincere interest in a fair solution to your problems, we welcome the opportunity afforded the osteopathic profession in Kansas to present evidence in support of your position. We shall strive, as always, to prevent a compromise on standards of health care but if that question can be resolved as you apparently believe it can be, then I feel certain that no other important barrier to complete agreement between our associations will remain.

Sincerely,
Lucien R. Pyle, M.D.
President

Oklahoma City Clinical Society

The Oklahoma City Clinical Society, which had its beginning in 1930, will open its 23rd annual four-day conference on October 26. A large attendance is expected since Oklahoma City, centrally located and easily accessible, is rated third in the nation as a convention city.

The program of postgraduate instruction will include lectures and discussions by 16 distinguished guest speakers from medical and teaching centers throughout the nation, in addition to presentations by Oklahoma physicians. Dr. Edward J. McCormick, president of the American Medical Association, will speak at a banquet meeting on October 26. There will also be daily luncheon round table sessions and a clinical pathologic conference. Entertainment will include dinner meetings, a dinner dance, and a stag smoker.

A complete list of speakers taking part in the program appeared in an advertisement on Page 450 of the September issue of the Journal.

All physicians who are members of their respective county medical societies are invited to attend. A registration fee of $20 will be charged, covering all features of the program.

ACTIVITIES OF MEMBERS

Dr. William T. Sirridge, Kansas City, recently reported for duty with the Army Medical Corps. Commissioned as a captain, Dr. Sirridge is stationed at Fort Riley and is expecting to serve for a period of two years.

Dr. George B. Morrison, who has been practicing in Wichita since 1928, has announced his retirement from active practice, effective September 15. He plans to move to Nevada, Missouri.

Dr. Laurence G. Heins, Dr. Kenneth E. Conklin, and Dr. Laurel G. Case were three of eight who contributed toward the purchase of a McKesson anesthetic unit for the Dickinson County Memorial Hospital, Abilene. All are members of the Dickinson County Medical Society.

Dr. Grace Ketterman, who received an award as an outstanding intern at Menorah Hospital, Kansas City, Missouri, when she completed her work there recently, has accepted a position as assistant director of public health in Kansas City, Kansas.

Dr. Paul H. Wedin, Wichita, recently completed a two-months course in cardiac surgery at the Hahnemann Clinic, Philadelphia.

Dr. Orville S. Walters, who has been practicing in McPherson for the past eight years, has begun a two-year course as a fellow in the Menninger School of Psychiatry, Topeka. During his absence his practice in McPherson is being cared for by Dr. W. P. Hibbett.

Dr. D. V. Conwell and Dr. C. J. Kurth, Wichita, are co-authors of a paper, "Treatment of Mental Disorders in the Geriatrics Patient," published in the June issue of the *Journal of the American Geriatrics Society*. Dr. Conwell recently became a fellow of the American Psychiatric Society.

Dr. Arthur J. Revell, Topeka, was appointed last month to the Topeka-Shawnee County Advisory Board of Health to replace Dr. Ernest H. Decker, who resigned.

Dr. Charles H. Miller, Parsons, became a fellow of the International College of Surgeons at a meeting held in New York City last month.

Dr. Herbert C. Miller, chairman of the department of pediatrics at the University of Kansas Medical Center, was recently appointed to an advisory committee to serve the Kansas Council for Children and Youth, under the jurisdiction of the State Department of Social Welfare.

Dr. Andre Baude, Topeka, received word last month that he had been named Kansas representative on the advisory board of the American Trudeau Society.

Dr. Joseph A. Budetti, Wichita, has been named an honorary member of the Tokyo chapter of the Otorhinolaryngological Society of Japan.

Dr. Alfred O'Donnell, Ellsworth, received a 50-year Masonic emblem at a meeting held in Ellsworth in August.

Dr. William J. Reals, Wichita, has been awarded a commendation ribbon by the U. S. Air Force for his aid in expanding medical services and in establishing a medical laboratory at the Sheppard Air Force Base, Wichita Falls, Texas.

Dr. William C. Menninger, Topeka, spoke on "Improving Understanding and Productivity through Human Relations" before the annual meeting of the National Association of Food Chains on September 29 at Chicago.

Dr. David L. Traylor, Emporia, gave the address to the graduating class at Newman Hospital School of Nursing, Emporia, last month.

Dr. A. M. Cherner, Hays, has completed a course of study in the use of radioactive isotopes and is now approved by the Atomic Energy Commission for using such isotopes at Hadley Hospital, Hays.

Dr. Frederic O. Epp, who has been practicing in Augusta for the past five years, has announced plans to open an office in Wichita about October 1.

Dr. Benjamin M. Matassarin, Wichita, was guest speaker at the September meeting of the Sedgwick County Medical Assistants' Society.

Status of Grievance Committees

A detailed report on county medical society grievance committees has been prepared by the A.M.A. Council on Medical Service to outline the organization, functions, and operations of 198 mediation committees throughout the country. In the study, societies were divided into groups according to size. Copies of the report are available from the Council on Medical Service.

Pediatric Society Organized

Thirty-five Kansas physicians became charter members of the Kansas State Pediatric Society at an organization meeting held at Emporia on September 19. Dr. Frank L. Menehan, Wichita, was elected president of the group. Dr. B. I. Krehbiel, Topeka, was chosen as vice-president, and Dr. David R. Davis, Emporia, was named secretary-treasurer.

A postgraduate course for pediatricians was the feature of the day-long program. Dr. Harold Palmer of Children's Hospital, Denver, presented two papers, "Hematologic Problems in Pediatric Practice" and "Jaundice in the Neonatal Period," and answered questions at a round table luncheon session. A social hour and banquet followed the scientific and business sessions.

Psychiatric Conference in Topeka

One of the 1953 regional conferences of the American Psychiatric Association will be held at the Menninger Foundation, Topeka, October 23 and 24, under the joint sponsorship of the Menninger Foundation and the University of Kansas School of Medicine.

Although the general theme to be covered is the treatment of psychiatric patients, special attention will be given methods for determining the effectiveness of various kinds of treatment.

Scheduled to present papers at the conference are Dr. Jules H. Masserman, Chicago, widely known for his work in experimental neurosis; Dr. James G. Miller, chairman of the Department of Psychology at the University of Chicago; Dr. George A. Ulett, associate professor of psychiatry at Washington University; Dr. Abram Hoffer, director of psychiatric research in the province of Saskatchewan; Dr. D. Louis Steinberg, superintendent of Elgin State Hospital, Illinois, and Dr. Karl A. Menninger, chief of staff of the Menninger Foundation. Dr. John Benjamin, Denver, will bring the meeting to an end with a summary and critique of the papers and discussions.

Distinguished research workers from universities and hospitals in the region will act as discussants, and the Topeka Psychoanalytic Society is joining the conference on the second day.

Licensed Practical Nurses

A practical plan to provide trained personnel for caring for the sick was inaugurated at the University of Kansas Medical Center with the establishment of the Florence Cook Department of Practical Nurse Education. Forty-two students have been graduated from the new one-year course.

A practical nurse is defined as a person trained to care for mothers and new babies, convalescent patients, people suffering from the infirmities of old age, and others with chronic or light illnesses who do not require highly specialized treatments. She is also prepared to assist a professional nurse in the care of more acutely ill patients.

The practical nurse works under the direction of a doctor or professional nurse either in a home, hospital, or other institution, or public health agency. Her course of study includes less science and technical detail than that of a professional nurse and takes less time. The two types of nurses wear different insignia.

Qualifications for entrance to the school are designed to include young women who are interested in nursing as a career but are not scholastically capable of becoming registered nurses and more mature women seeking a profession that offers financial security without the expenditure of a great amount of time and money.

The course is open to women 18 years of age and older. Those under 25 must have had at least two years of high school; older candidates may qualify with an eighth grade education. All must be in good health and must possess desirable personal traits.

During the first three months, the course consists of discussions, demonstrations, and practice in nursing and homemaking. The second quarter is devoted to basic hospital experience in medical and surgical nursing and dietetics. The last six months include experience in pediatrics, obstetrics, and nursing in the home. Work in small hospitals is arranged for students who can leave Kansas City for that period. A graduate receives a certificate from the University of Kansas and is eligible to take an examination for licensing as a practical nurse.

Graduates have little difficulty in finding employment. Frequent requests for their services are received from hospitals, nursing homes, visiting nurse associations, and doctors.

Complete information on the course will be supplied by Mabel S. Campbell, R.N., Director, Florence Cook Department of Practical Nurse Education, University of Kansas Medical Center, Kansas City 3, Kansas.

Public Relations Conference

The A.M.A.'s sixth annual public relations conference will be held on Monday, November 30, the day before the opening of the A.M.A. clinical session, at the Jefferson Hotel, St. Louis. The program will be geared primarily for physicians. Among those invited are members of the A.M.A. House of Delegates, officers of state and county medical societies, executive secretaries, and public relations personnel.

An Evaluation of the Toxicity of Chloramphenicol*

Hershel A. Danemann, M.D.**

Chicago, Illinois

Chloramphenicol (Chloromycetin®), a new broad spectrum antibiotic, has traveled a turbulent course in the brief three or four years it has been in use. Once hailed as one of the most efficacious of the wonder drugs, the rationale for its use is now questioned by many physicians. The drug manufacturer insists that physicians are making "much ado about nothing," and continues to laud his product. Medical journals, on the other hand, have carried a number of articles warning of danger in the use of this drug. The physician in the middle of this turmoil is left with many doubts as to the validity of either of these views. In the following pages I will attempt to correlate the present views on this subject, hoping in the process not to confuse the issue further.

HISTORICAL

In late 1947 reports began to appear in the literature concerning a new antibiotic obtained from the fermentation products of the mold Streptomyces venezualae. This drug, chloramphenicol, was found to be effective, in vitro, against such organisms as B. abortus, Myco. tuberculosis, Salmonella, Shigella, E. coli, and Staph aureus.[4] Later studies in chick embryos and mice demonstrated definite activity against rickettsia with no apparent toxic symptoms.[25] As a result of in vivo experiments in dogs, this drug was found to have most marked activity against rickettsia and gram negative organisms. The only toxic activity noted was a reversible anemia in dogs following parenteral administration.[28]

Following in vivo studies in man, it was found to be most effective against rickettsial diseases, having some slight anti-viral activity, but in comparison to other antibiotics it was preferred against only one organism, typhoid.[26] At that time no toxic symptoms were noted in man, although several authors had noted a slight transient leucopenia in patients being treated, the leucopenia clearing up following the discontinuation of the medication.[19,27] By early 1949, 90 per cent of the drug used was being produced by chemical synthesis, and no appreciable difference was found in the action or safety of this new compound.[13]

In August, 1949, certification of chloramphenicol was initiated by an amendment to the Federal Food, Drug, and Cosmetic Act. The evidence at that date indicated a low incidence of side effects and none of serious nature.[13] Soon afterwards, various authors began to report the results of experiments involving chloramphenicol administration in normal people. For all intents and purposes, these series showed that the drug caused no serious toxic effects.[15,17] However, certain minor toxic manifestations were noted and these are mentioned below.

ORAL AND GASTROINTESTINAL COMPLICATIONS

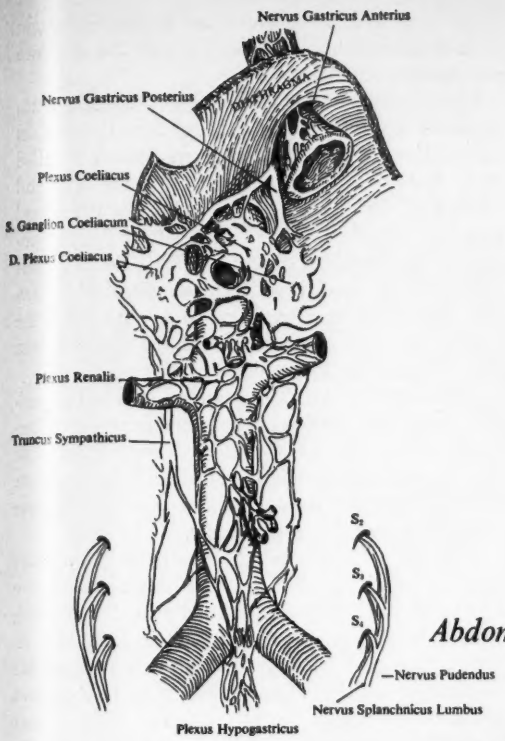
Williams[35] studied 200 patients receiving chloramphenicol. Six per cent showed oral or pharyngeal reactions manifested by glossitis and black tongue, stomatitis, pharyngitis, or infection of the mouth and throat by Monilia. The soreness of the mouth, tongue, and pharynx began on the fourth to sixth day of therapy. Monilia infection was found in five patients, and black tongue in four. It was noted that the most severe reactions occurred in patients receiving other antibiotics in addition to chloramphenicol. There appeared to be no relationship of the dose of the medication to the severity of the reaction.

Tomaszewski et al.,[31] however, in a series of 70 patients treated with chloramphenicol, felt these effects were seen more often in patients treated for a longer time and with large doses. His patients received a few grams to 96 Gm. (average 32 Gm.). He reported dry mouth in 40 per cent, denuded tongue in 52 per cent, flatulence in 34 per cent, nausea in 17 per cent, red oral mucous membranes in 17 per cent, vaginal irritation in 17 per cent, and rectal irritation in 13 per cent. The tongue lesions were due to disappearance of the normal bacterial flora with replacement by the fungus Candida albicans. More marked reactions were noted in women and in cases previously treated with penicillin and streptomycin.

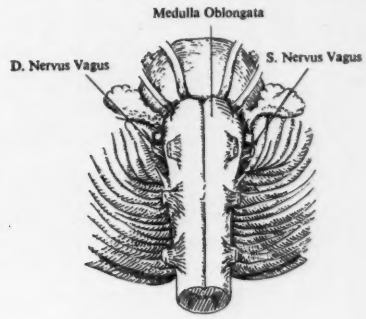
Harris,[9] in a series of 46 patients, recorded the results of careful observations over a period of one year. His cases received an average of 25 Gm. in 10 days. Several patients received two to four courses of treatment. He also noted a preponderance of gastrointestinal reactions in women as compared to men (3:1). This was attributed to "hormone activity through interference with enzyme systems." Nausea and vomiting were seldom encountered. Mild diar-

* This is one of 11 senior theses selected for publication by the Editorial Board from a group of 15 judged the best by the faculty of the University of Kansas School of Medicine.

** Thesis written while the author was a senior student. Dr. Danemann is now interning at Michael Reese Hospital, Chicago, Illinois.



Central origin of the vagus nerves (parasympathetic)



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SEARLE Research in the Service of Medicine

rhea was present early in the course of treatment in a small per cent of the cases. This lasted for a day or two and was then followed by constipation. Capricious appetite and odorless stools were also noted.

Catnazaro et al.[1] reported the occurrence of a low salt syndrome in a cardiac on 1.5 Gm. salt a day. The patient received a total of 21 Gm. chloramphenicol over a period of 10 days, and the resultant diarrhea precipitated the low salt syndrome. Reiner et al.[20] reported the occurrence of pseudomembranous colitis in two patients receiving chloramphenicol.

DERMATOLOGIC COMPLICATIONS

As compared to other antibiotics, chloramphenicol shows relatively few cases of acquired contact sensitivity. Robinson et al.[24] treated 70 patients having various pyodermas with 1 per cent chloramphenicol cream and reported only two cases of skin sensitivity. Newman et al.[18] treated 126 patients having pyogenic dermatoses with chloramphenicol cream (oil in water) and reported only one case of sensitivity. The cream was also used as a prophylactic dressing after removal of skin tumors in 100 patients, and there was no instance of contact dermatitis. No skin complications have been reported as a result of oral administration.

NEUROLOGIC COMPLICATIONS

Wallenstein[33] reported a neurotoxic reaction in a 24-year-old female treated continuously for ulcerative colitis. The patient developed bilateral optic neuritis, severe peripheral neuritis, and a severe leucopenia which cleared up following discontinuation of the drug and supportive treatment. Mental symptoms were reported in four patients being treated for pneumonia.[37] These consisted of mild depression in two cases, "dazed feeling" in one case, and confusion in one case. Smadel[26] reported a transient mild euphoria in several patients being treated for infectious diseases.

HEMATOLOGIC COMPLICATIONS

Judging from the above reports, and from a review of the literature published following the certification of chloramphenicol, it would seem that this drug was relatively safe and highly efficacious in comparison with other current broad spectrum antibiotics. In early 1950, however, reports were published concerning the role of chloramphenicol as an etiologic agent in the development of certain blood dyscrasias. The first few cases reported concerned the development of severe reversible leucopenias in patients receiving chloramphenicol therapeutically, usually in severe infections.[6,19,23,33] In most of these cases, no other drugs were being given that might be thought to cause hematologic changes, and thus the evidence was mostly circumstantial.

However, to some observers, such a toxic manifestation was not too surprising. Shortly after its introduction, at least one observer, Smadel,[26] called attention to the nitrobenzene radical in the drug and warned of its possible toxic action on the blood forming organs. Smadel,[27] in 1948, reported leucopenia and reduction in hemoglobin in a typhus patient being treated with chloramphenicol. However, the white count returned to normal while the patient was still on therapy, and the changes seen were thought due to the disease.

Volini et al.,[32] in 1950, reported on their experience with three patients who were receiving chloramphenicol in therapeutic doses. A severe reversible granulopenia appeared in the blood and a granulocyte hypoplasia, with both erythroid and granulocyte maturation arrest, in the marrow.

Johnson et al.,[12] in 1950, reported on three patients with lupus erythematosus disseminatus being treated with chloramphenicol. In two, the existing anemia became greater during treatment. Erslev[5] recently reported similar instances of reversible erythrocyte and leucocyte depression in two patients being treated for Salmonella infection. One patient received a total of 155.5 Gm. in 50 days, and the other 66.5 Gm. in 24 days. Both patients, however, received other drugs before and during therapy. Anemia, leucopenia, hypoplasia of the erythropoietic marrow, and myeloid arrest at the metamyelocytic stage were observed.

In December 1950, Rich, Ritterhoff, and Hoffman[22] reported a case of fatal aplastic anemia in an elderly male patient who received chloramphenicol for a chronic renal infection three months prior to his death. Since that date, approximately 28 cases of fatal aplastic anemia have been reported in which chloramphenicol has been indicated as the causative factor.[2,3,7,8,10,16,21,22,29,30,34,36]

Hargraves, Mills, and Heck[7,8] have reported the largest single series with reasonably adequate laboratory and physical studies. In all cases, the bone marrow showed a decrease in myeloid and erythroid elements and a decrease to absence of megakaryocytes. The most common presenting sign was either purpura or petechia. In most cases, the onset of symptoms occurred a few months to a year following the first dose of the drug. However, in some cases, the time between the first ingestion of the drug and the onset of symptoms could be measured in hours rather than days.

No correlation has been possible between dosage of the drug and severity of symptoms. In some cases, the hypoplastic process following the intake of only

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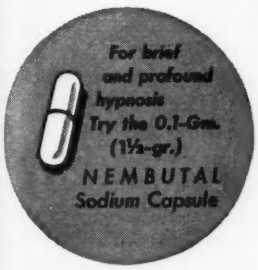

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a few grams was of much greater severity than that noted where massive amounts had been ingested prior to onset of symptoms. The anemic process has been seen to follow single courses of the drug. However, some patients have undergone intermittent medication without ill effect, only to develop the hypoplasia following subsequent courses of treatment. In general, the patients underwent a similar downhill course as regards both physical and laboratory findings.

As with other aplastic anemias, no effective method of treatment has been found. Both corticotropin and cortisone have been used with little benefit. Death, in most cases, occurred as a result of uncontrollable hemorrhage or overwhelming infection.

In the latter part of 1952, Lewis et al.,[13] of the Federal Security Agency, conducted a special survey on chloramphenicol and other drugs in relation to blood dyscrasias. In all, 44 cases of aplastic anemia were tabulated in which chloramphenicol could be said to be the only agent present to account for the dyscrasia. Of these, 23 died due to the hypoplastic process. Of interest was the observation that the distribution by sex showed females to predominate over males by nearly 3:1.

The incidence of reported cases among Negroes was found to be infrequent. Distribution by age showed that all age groups were represented. "The dosage regimen appeared to have little or no bearing on the development of the dyscrasia." The authors commented on the high incidence of multiple, intermittent, and prolonged administration as opposed to single courses of the drug in the cases reported. The authors further said, "It cannot be stated categorically that the incidence of blood dyscrasias has increased since chloramphenicol became available." As a result of this survey, the Food and Drug Administration directed the drug manufacturer to indicate, by label, that chloramphenicol might be associated with blood dyscrasias.

ETIOLOGY

That chloramphenicol, in certain susceptible individuals, causes undesirable side reactions cannot be questioned. Reactions manifested in the blood-forming tissues are the most important. The question now arises as to the mechanism responsible for these hemopoietic changes. Several theories have been proposed to explain this phenomenon.

First of all, it may be theorized that more than one type of hemotoxic reaction has been reported. In the earlier cases discussed in the literature, reversible leucopenia and erythropoietic depression were described. Later, a series of cases of fatal aplastic anemia were reported.

Are there two distinct types of reactions, or two different phases of the same process? In favor of the latter, it may be noted that the reversible changes were found early in the course of those patients upon whom routine blood counts were being run during the treatment period. In comparison, many of the cases of fatal aplastic anemia had no routine counts during therapy. However, many of the latter had adequate blood studies performed during the treatment period, only to succumb to anemia months later. Also, some patients received only small amounts of the drug, but nevertheless developed a fatal aplastic anemia within a short time following the onset of treatment.[36]

One author[38] suggests the possibility of two types of hematologic reactions. One is a transient depression of the formed elements of the blood involving the red cells, white cells, and platelets, occurring rarely in those patients receiving very large doses, or in those with renal insufficiency. In these patients, the blood returns to normal when the drug is stopped. The other is a true aplastic anemia occurring in people who had previously received one or more courses of the drug without serious effect. When the drug was subsequently administered, even in small doses, a severe blood abnormality appeared.

Unfortunately, this theory does not explain the cases of fatal aplastic anemia occurring following a single course of therapy. Also, as stated before, it has not been proved that high doses or prolonged administration of the drug are related to bone marrow depression.

Several authors[8,29] have suggested an allergic or sensitivity mechanism as being responsible. This theory is similar, in part, to one previously mentioned in that it refers to the uneventful administration of one or several courses of treatment, followed by a subsequent course in which the patient succumbs to an aplastic process. Lewis et al.[13] found a history of allergy in only 20 per cent of their cases of aplastic anemia associated with chloramphenicol. They stated, however, "In the ultimate explanation of the phenomenon leading to development of blood dyscrasias in the patient receiving chloramphenicol and other drug therapy, it is anticipated that hypersensitiveness may play a role."

The benzene ring structure of chloramphenicol has been held responsible by some authors.[3,34,39,30] If this were true, one would expect to see a greater correlation between time and dosage schedules. Smiley et al.,[29] however, state that in benzol poisoning the drug is usually given intermittently and dosage has no significance, as with chloramphenicol. Sturgeon[30] recalls that in some dyscrasias secondary to benzol, the anemia may appear a few weeks or many years

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following exposure, or it may not be discovered until many years afterward at the onset of an infection.

Since the drug is produced both by chemical synthesis and by fermentation, the possibility of a hemotoxic impurity in one preparation, but not in the other, has been speculated.[13] Since its certification, 90 per cent of the drug has been synthetically produced. Lewis et al.[13] stated, "Despite the fact that previous and current studies have offered no basis for this assumption, controlled studies to clarify this point are now in progress."

Wilson et al.[34] assuming the changes occurring are due to the influence of the benzene ring, suggested that the following alterations be looked for in the peripheral blood of a patient under chloramphenicol therapy: (1) early evidence of stimulation of the various myeloid elements, i.e., rise in red or white cell count; (2) increase in eosinophiles; (3) reduction in granulocytes; (4) reduction in thrombocytes; (5) decrease in erythrocytes. They proposed routine blood cell counts twice weekly during therapy to discover toxic changes.

Heck,[11] however, stated that routine blood counts are of little value due to the longevity of the cellular elements of the blood. This tends to mask the underlying aplastic process, so bone marrow studies were suggested as the only means of revealing the true status of the hemopoietic system. Heck further commented that doing routine blood counts, as suggested by the manufacturer, cannot be effective since the changes in the blood do not develop as an acute reaction, but frequently occur late after recovery from the infection for which the drug was given.

Ley[14] noted a fall in the reticulocyte count in a patient receiving chloramphenicol. He suggested that reticulocyte studies might be more indicative of the condition of the bone marrow than peripheral blood counts. Erslev[5] reported, in one patient recovering from hemopoietic depression due to chloramphenicol, that there was a definite reticulocyte response heralding the return of the marrow to normal.

DISCUSSION

Chloramphenicol, a new broad spectrum antibiotic, has been shown to have merit in certain infectious diseases in which other antibiotics are relatively ineffective. A review of the toxicity of this drug shows that, on the whole, these undesirable reactions are minimal in occurrence. Chloramphenicol cream as a surface medication has been shown to cause practically no allergic reactions. However, a relationship between this drug and certain blood dyscrasias has definitely been established. The most serious of these dyscrasias is aplastic anemia. In the cases reported, the mortality has been almost 100 per cent. The mechanism by which this drug causes hypoplasia of bone marrow is not known.

The most popular school of thought as to the etiology of this mechanism involves a two-fold process: (1) A direct toxic effect of the drug on the bone marrow of certain susceptible individuals. This is thought to be related to the benzene ring structure of chloramphenicol. It is thought to be reversible following withdrawal of the drug. (2) An allergic or hypersensitivity mechanism as a result of intermittent use of the drug. This process is irreversible and fatal.

This theory does not explain all the hematologic phenomena seen. No tests have been devised to determine whether an individual is susceptible to the toxic action of the drug. Routine blood counts during therapy, as suggested by the manufacturer, are not thought to be of any avail since the longevity of the cellular elements of the blood would mask the underlying aplastic process. However, the counts would be of value in preventing cases of reversible cellular depression.

In all fairness to the manufacturer, it must be admitted that the evidence is mostly circumstantial. Parke, Davis and Company, in a recent publication,[40] estimated that approximately 8,000,000 people have taken therapeutic courses of at least 10 Gm. of chloramphenicol since its certification. They further point out that the mortality rates for aplastic anemia in this country have not increased in recent years in spite of the introduction of chloramphenicol. However, they fail to recognize the case histories of patients wherein this drug has played such an obvious part in the development of the aplastic process.

As has been proposed by many authors, the use of chloramphenicol, indeed, the use of any drug, should be based on a "calculated risk," that is, the mortality of the disease process should be weighed against the toxicity of the therapeutic agent. Chloramphenicol has usefulness in certain infectious diseases where other antibiotics are of no avail. However, as Heck[11] suggests, "Chloramphenicol should not be used if there are other antibiotics with the same general effect."

CONCLUSIONS AND SUMMARY

1. The toxic manifestations of chloramphenicol have been reviewed.

2. The most important reaction reported involves the part played by this drug in certain blood dyscrasias, namely aplastic anemia. This has been shown to necessitate a careful evaluation of the criteria calling for the use of chloramphenicol in infectious diseases.

3. Since the exact causative mechanism of the

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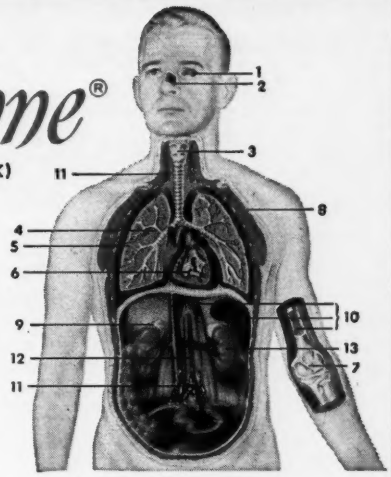

Primary Sites of Pathology and Indications

1. **EYE**—Inflammatory eye disease. 2. **NOSE**—Intractable hay fever. 3. **LARYNX**—Laryngeal edema (allergic). 4. **BRONCHI**—Intractable bronchial asthma. 5. **LUNG**—Sarcoidosis. 6. **HEART**—Acute rheumatic fever with carditis. 7. **BONES, JOINTS, AND BURSAE**—Osteoarthritis; Rheumatoid arthritis; Rheumatoid spondylitis; Acute gouty arthritis; Still's disease; Psoriatic arthritis; Bursitis. 8. **SKIN AND CONNECTIVE TISSUE**—Pemphigus; Disseminated lupus erythematosus; Scleroderma (early); Dermatomyositis; Atopic dermatitis; Exfoliative dermatitis; Dermatitis venenata (*e.g.*, poison ivy); Dermatitis medicamentosa. 9. **ADRENAL GLAND**—Congenital adrenal hyperplasia; Addison's disease; Following adrenalectomy for hypertension, Cushing's syndrome, and neoplastic diseases. 10. **BLOOD, BONE, AND MARROW**—Allergic purpura; Acute leukemia* (lymphocytic or granulocytic); Chronic lymphatic leukemia.* 11. **LYMPH NODES**—Lymphosarcoma;* Hodgkin's disease.* 12. **ARTERIES AND CONNECTIVE TISSUE**—Periarteritis nodosa (early). 13. **KIDNEY**—Nephrotic syndrome, without uremia (to induce withdrawal diuresis). 14. **VARIOUS TISSUES**—Angioneurotic edema; Serum sickness; Sarcoidosis; Drug sensitization; Waterhouse-Friderichsen syndrome.

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dyscrasias has not been determined, further investigative work is required to clarify the situation.

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Polio Care in Kansas

Although it is the belief of agencies involved in providing polio care that financial responsibility rests with the individual or his family whenever possible, arrangements for other resources may be made in some instances.

The Kansas Crippled Children's Commission, an official agency of the state, will accept responsibility for patients committed to its care by action of the probate court. The patients, however, must be single, under 21 years of age, and in need of financial assistance.

Patients receiving such assistance are hospitalized at the following locations: University of Kansas Medical Center, Bethany Hospital and St. Margaret's Hospital in Kansas City; Wesley, St. Francis and Wichita Hospitals in Wichita; Stormont-Vail Hospital in Topeka; St. Elizabeth's and Grace Hospitals in Hutchinson; St. Anthony's and Hadley Memorial Hospitals in Hays, and Asbury Hospital in Salina. Post-polio cases only will be cared for at St. Francis Hospital, Topeka.

The National Foundation for Infantile Paralysis assists any family in meeting its financial responsibility for the care of polio patients in those instances where meeting the obligations would seriously alter the family living standard. The need for assistance is determined in each county by the local chapter, and no specific means test is applied. Included in such benefits are medical, hospital, nursing, physiotherapy, transportation, appliances, and other related services.

In addition to the hospitals listed above, the Foundation will provide payment for patients at these additional institutions: Bethel Hospital, Newton; Newman Memorial Hospital, Emporia; St. Rose Hospital, Great Bend; St. Joseph Hospital, Concordia; St. Mary's and William Newton Memorial Hospitals, Winfield; Arkansas City Memorial Hospital, Arkansas City; St. Thomas Hospital, Colby, and Neosho Memorial Hospital, Chanute.

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General Surgery, Two Weeks, starting October 12
Surgery of Colon & Rectum, One Week, starting October 26
Thoracic Surgery, One Week, starting October 12
Esophageal Surgery, One Week, starting October 19
Breast & Thyroid Surgery, One Week, starting October 26
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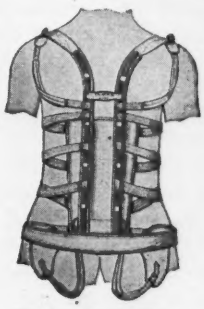

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COUNTY SOCIETIES

The first fall meeting of the Shawnee County Medical Society was held at the society's building in Topeka on September 8, following a dinner. Dr. G. O'Neil Proud, of the University of Kansas Medical Center, spoke on "Safe and Dangerous Ears." At the business session three associate members were transferred to active status and two new members were added.

A meeting of the Riley County Medical Society was held at Manhattan in August with city and county officials in attendance to discuss plans for a city-county health department. Dr. Vernon M. Winkle, Topeka, a representative of the Kansas State Board of Health, explained the organization of such a department. It was decided that city and county commissioners should form a joint board of health with which the Society will work to complete organization plans.

ANNOUNCEMENTS

The National Foundation for Infantile Paralysis announces the availability of a limited number of additional postdoctoral fellowships to candidates whose interests are research and teaching in medicine and the related biological and physical sciences. The purpose of the fellowships is to increase the number of professional workers qualified to give leadership in the solution of basic and critical research problems of poliomyelitis and other crippling diseases.

The fellowships cover a period of from one to five years. Stipends range from $3,600 to $7,000 a year, with consideration given to marital and dependency status. A total of 181 fellowship awards had been made by the Foundation up to August 1, 1953.

Complete information concerning qualifications and applications may be obtained from the Division of Professional Education, National Foundation for Infantile Paralysis, 120 Broadway, New York 5, New York.

The American Society for the Study of Sterility announces the opening of the 1954 contest for the most outstanding contribution to the subject of infertility and sterility. The winner will receive a cash award of $1,000. Essays must be submitted no later than March 1, 1954. Information may be secured from the Society, 920 South 19th Street, Birmingham, Alabama.

A postgraduate course on diseases of the chest will be offered at the Hotel New Yorker, New York City, November 2-6, under the sponsorship of the Council on Postgraduate Medical Education of the American College of Chest Physicians. A registration fee of $75 will be charged. Information may be obtained from the College, 112 East Chestnut Street, Chicago 11, Illinois.

The 1953 annual convention of the National Society for Crippled Children and Adults will be held at the Palmer House, Chicago, November 12-14. Programs and information may be obtained from the Society, 11 South LaSalle Street, Chicago 3, Illinois.

The 20th annual meeting of the American College of Chest Physicians will be held in San Francisco, June 17-20, 1954. Physicians interested in presenting scientific papers should write Dr. Edgar Mayer, 850 Fifth Avenue, New York 21, New York, before January 1, 1954.

Report on Multiple Screening Services

Bringing together all available information on multiple screening techniques throughout the country was the object of a study recently completed by the A.M.A.'s Council on Medical Service. This technique involves the use of two or more simple laboratory tests, examinations or procedures, applied rapidly and on a mass basis, to determine presumptive evidence of unrecognized or incipient disease or defect.

In the A.M.A.'s study, data has been compiled on some 25 multiple screening surveys ranging from small county and industrial plant projects to city-wide and state-wide programs. Data also has been gathered on some of the single case-finding programs such as mass tuberculosis surveys, diabetes, cancer and heart disease detection clinics. The report includes comments and conclusions by those directly connected with the surveys studied, plus other pertinent information such as advantages and disadvantages and ultimate goals of these programs.

Copies of the full report will be distributed to all state medical societies. Additional copies will be available as long as the limited supply lasts. A complete bibliography on this subject may be obtained from the Council.

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Clinical Session in St. Louis

The seventh annual clinical session of the American Medical Association will be held in St. Louis, December 1-4. The program has been designed to give the general practitioner an opportunity to see and hear the latest developments in medicine.

Topics to be covered are chest injuries, compression fractures of the vertebra, chronic pancreatitis, weed poisoning, chronic arthritis, drugs and vaccine therapy, problems of delivery (manikin demonstrations), traffic accidents, and diabetes.

Scientific sessions, exhibits, lectures, motion pictures, and color television will be presented at Kiel Auditorium. The A.M.A. House of Delegates and Reference Committee will meet at the Jefferson Hotel.

Runyon Fund Grant Increased

A $10,000 grant from the Damon Runyon Memorial Fund for Cancer Research was awarded recently to the University of Kansas School of Medicine, following by one year a grant of $25,000 from the same source. Dr. Robert E. Stowell, who directs cancer research there, is assisted by Dr. Chauncey G. Bly and Dr. Harold J. Grady. The studies are concerned with the underlying function, chemistry, and structure of certain cancer cells.

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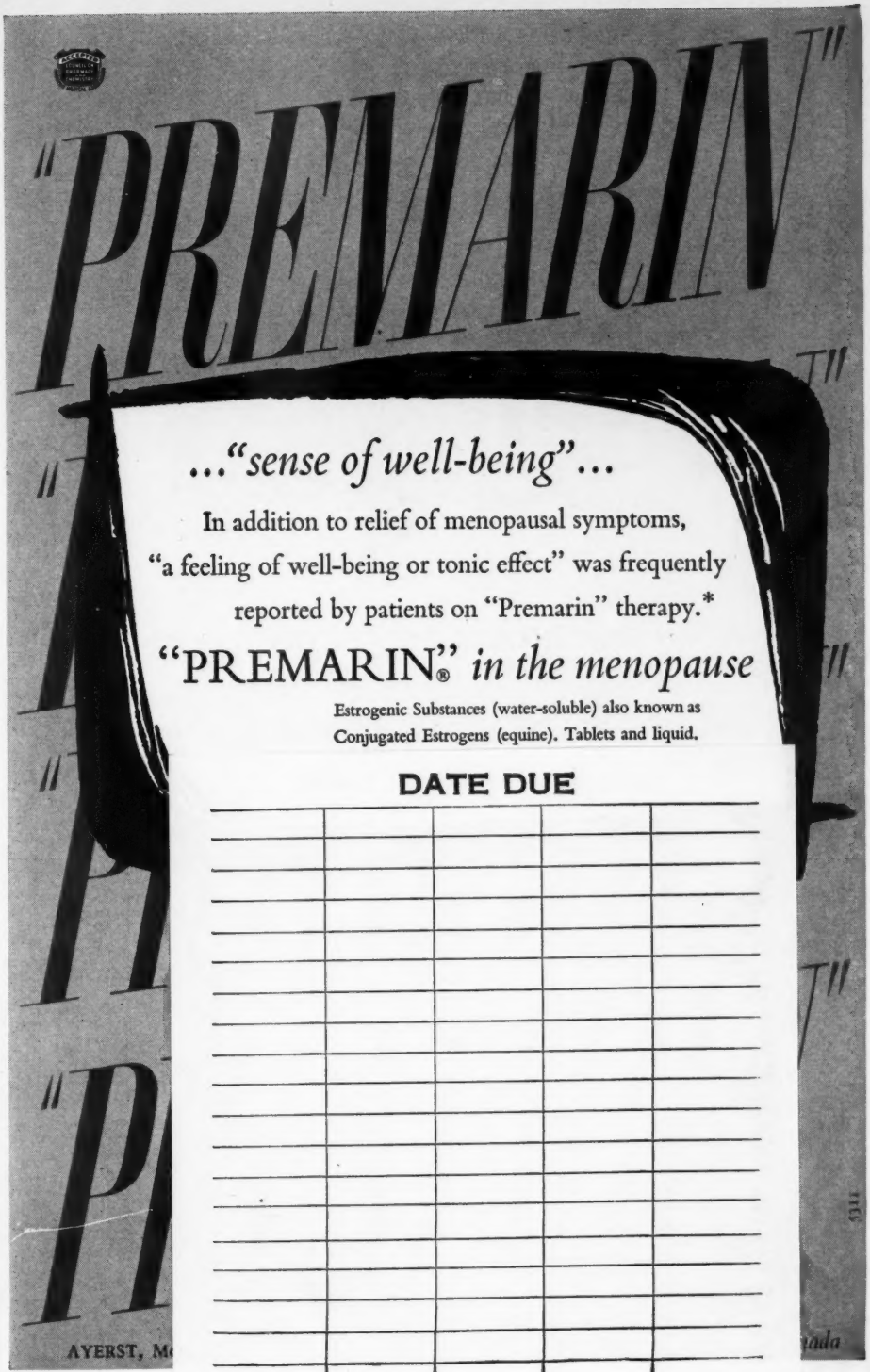
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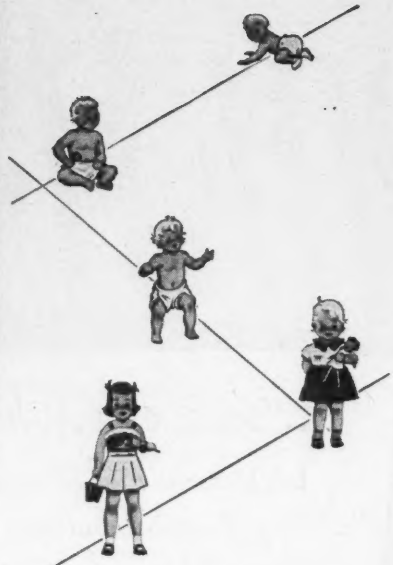

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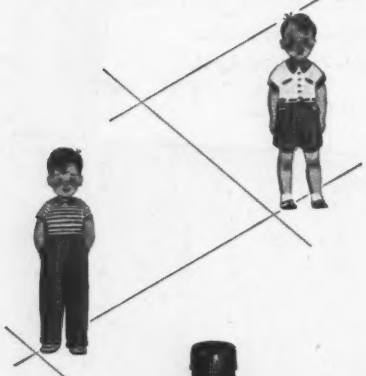

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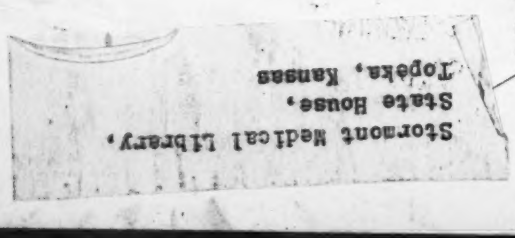
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